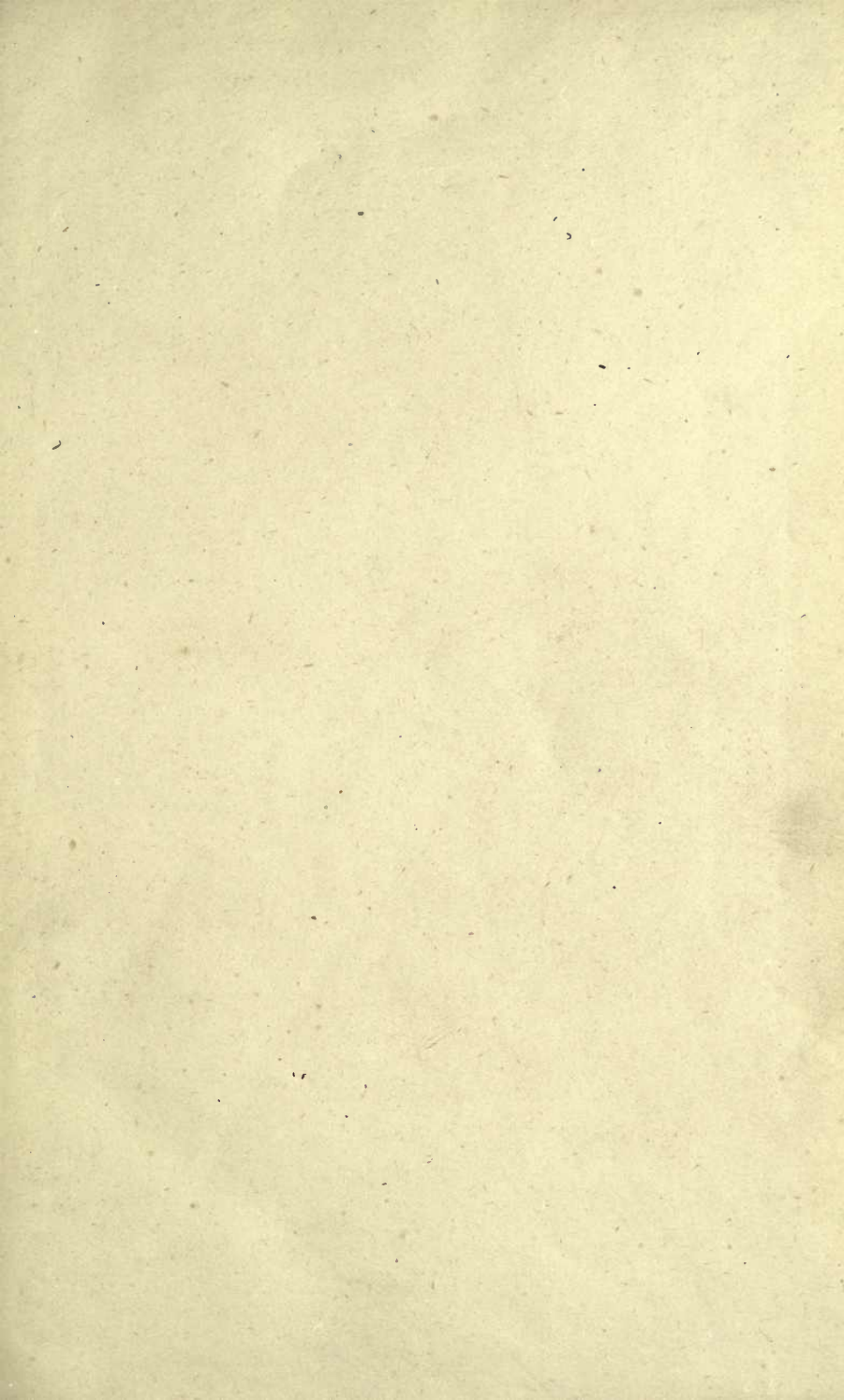
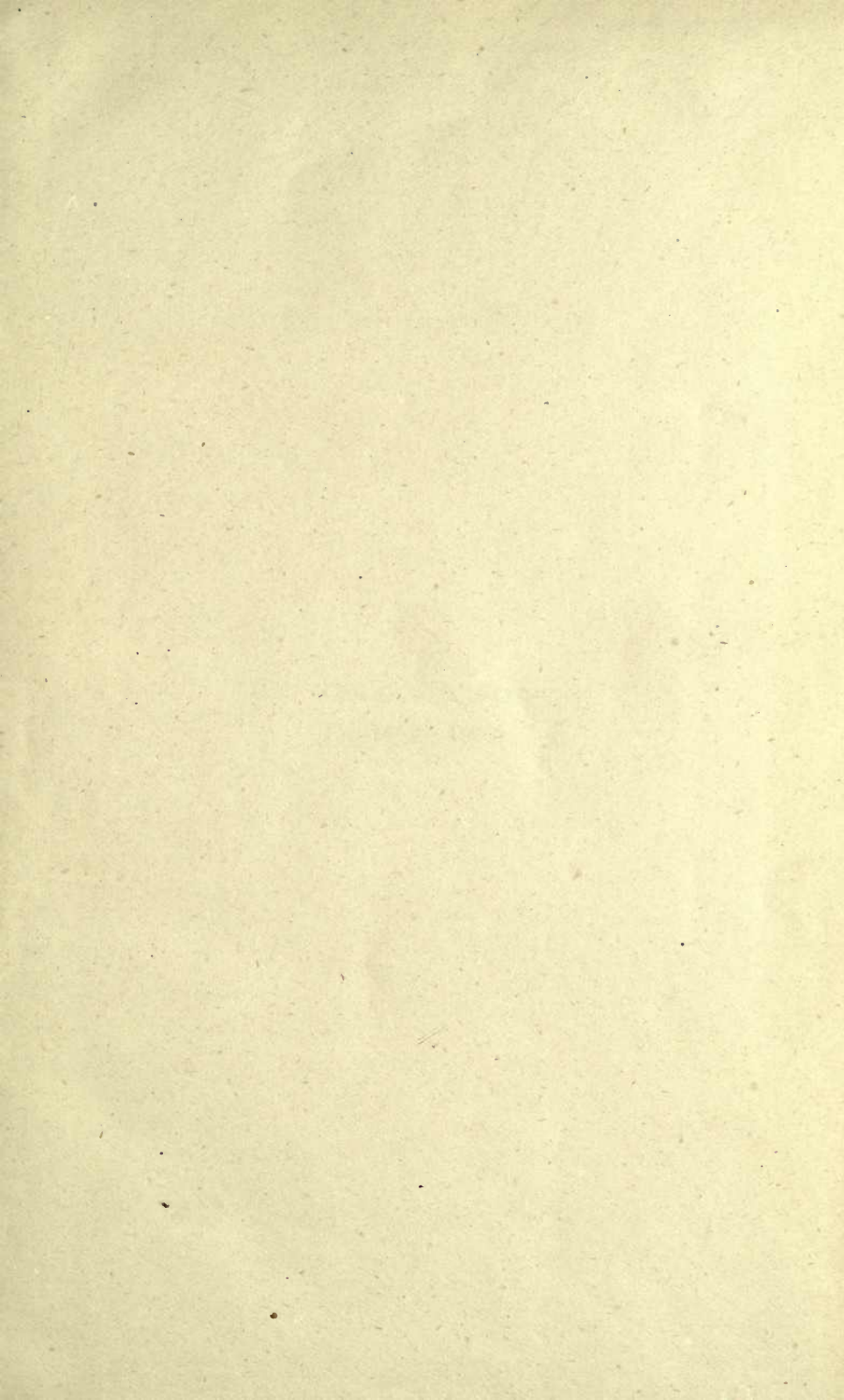


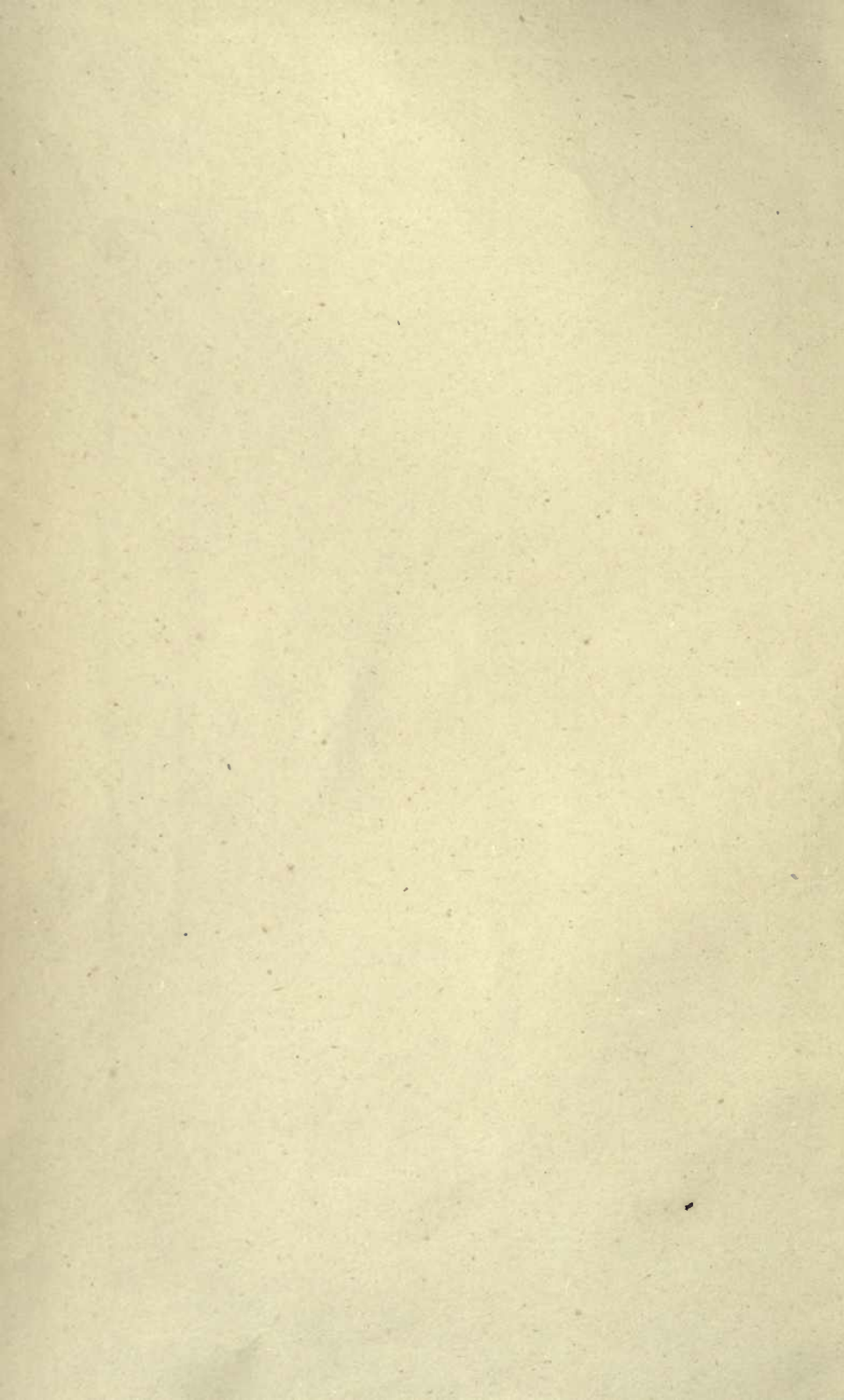


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5.







ZOOLOGIST:

POPULAR MISCELLANY

NATURAL HISTORY

CONDUCTED BY

EDWARD NEWMAN, F.R.S., Z.S., &c.

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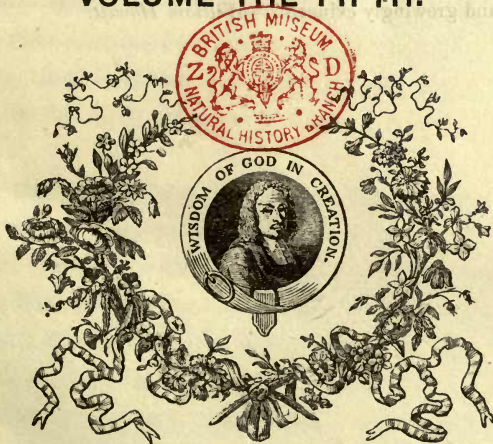
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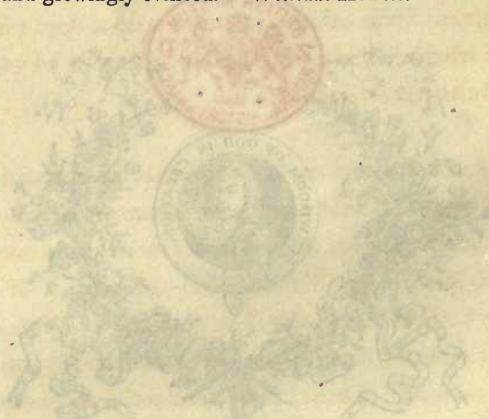
POPULAR MISCELLANY

NATURAL HISTORY.

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"The species of work to which this volume belongs, while it is not confined to the student of Natural History, but is addressed to all classes of readers, appears to me to be eminently useful in promoting that general acquaintance with Nature which is so highly to be desired, and for which a taste has of late been strongly and growingly evinced."—*William Howitt.*



LONDON:

JOHN VAN NOORDT, PATERNOSTER ROW.

M. DCCC. XLV.

PREFACE.

THE 'Zoologist' has pursued the even tenor of its way to the termination of a fifth year.

It is peculiarly gratifying to mark the subsidence of all opposition to its onward course. I am well aware that at the period of its commencement it was regarded by some as interfering with prescriptive technicalities and chartered obscurities. These sentiments, if still entertained, are kept in abeyance, and all public lamentations about the dissemination of Natural-History knowledge have long ceased. Conservative dulness finds other channels; and a doubt has arisen in the public mind whether the unintelligible, either in physics or metaphysics, be really the most valuable.

In my last address I made use of observations respecting the Ray Society, which I regret to find have been disagreeable to some of its members. It should be recollected that this society stands forth as the great Natural-History association of the country. Were it a private speculation I might be justified in passing it by, but it invites notice,—it makes a direct demand on our attention: it would be most uncourteous to preserve silence, most uncandid to conceal my real opinion of its proceedings. It must not be for a moment lost sight of, that a vast number, perhaps the majority of its members, became such from a perusal of the advertisements gratuitously circulated with the 'Zoologist,' a mode of addressing the lovers of Natural History which certainly is unequalled. My own recommendations, moreover, whether availing or otherwise I will not presume to say, were ardent

and incessant. I knew while I was doing this that I was tampering with my own interests, but I thought I was doing a public good, and I waived the consideration of private loss. Under these circumstances no one can charge me with mercenary motives, but whether they do so or not I shall express my opinions in any way I think proper.

I need not again repeat the expression of my admiration of Alder and Hancock's 'Nudibranchiate Mollusca.' I will only say, that this work in every respect maintains the reputation it has gained. But the Society's great work of the present year is a translation of Oken's 'Physio-philosophy,' a publication which, on its appearance, was ridiculed throughout Germany as the climax of absurdity, and which has never been tolerated by a single naturalist in that country from that day to the present. It is a mere rhapsody, written forty years ago, and, as the author expresses it, "in a kind of inspiration."

As I have no idea whatever of Oken's views, I can give none to others by an attempted abstract; but in order to bring his *matter* before my readers, I will transcribe a few passages which appear somewhat detached, and which I think suffer nothing from isolation: moreover, they approach more nearly to intelligibility than the greater part of the volume, and are those which a learned member of the Society has pointed out to me as favorable specimens.

" SOMETHING.

" 50. Still, however, there must be something which is posited and negated. The form must have a substance.

" This something is the primary idea, or the very Eternal of mathematics, the zero; for $+ - = 0$. The $+ -$ is naught else than zero affirmed; the $-$ naught else than this $+ 0$ negated $= - 0$. Now since an affirmation once declared is $= 1$, so are unity and zero identical. Zero differs only from finite unity in that it is not affirmed.

" 51. The $-$ is not simply the want of affirmation, but its explicit abstraction. The $+$ presupposes the 0; the $-$ the $+$ and 0; the 0 however presupposes neither $+$ nor $-$. Purely negative quantities are, as is known, a nonentity, because they can only bear reference to positive magnitudes. The $-$ is, indeed, the retroversion of $+$ into 0;

yet alone, therefore, it is not perfectly equal to 0. It is a retrovertent, and consequently the second *act*, which presupposes the positive. By the — we know what is not; the — is, however, a nothing in every respect. The — is the *copula* between 0 and +.

“52. If the + is the 0 posited, so is it a nothing posited or determined. This position is, however, a number, and therefore a mathematical something. The nothing thus becomes a something, a Finite, a Real, through the simple positing of itself, and the something becomes a nothing by the removal of its self-position. The nothing itself is, however, the mere neglect of its self-position. The something, the + —, has consequently not arisen or emerged out of nothing, or from the latter something associated with another been produced; but it is nothing itself; the whole undivided nothing has become unity. The nothing once posited as nothing is = 1. We cannot speak of production or evolution in this case; but of the complete identity and uniformity of the nothing with the something; it is a virgin product or birth.”—p. 11.

“MAN.

“97. Since the realization of the Eternal is a becoming self-conscious, so is the highest creature also a Self-conscious but a Singular. Such a creature is the finite God, or God become corporeal. God is *Monas indeterminata*, the highest creature is *Monas determinata*, *Totum determinatum*. A finite self-conscious being we call man. Man is an idea of God, but that in which God wholly, and in every single act, becomes an object unto himself. Man is God represented by God in the infinity of time. God is a Man representing God in one act of self-consciousness, without time.

“98. Man is God wholly manifested. God has become Man, zero has become + —. Man is the whole of arithmetic, compacted, however, out of all numbers; he can therefore produce numbers out of himself. Man is a complex of all that surrounds him, namely, of element, mineral, plant and animal.

“99. The other things *below* man are also ideas of God, but none of these ideas is the whole representation of arithmetic. They are only parts of the divine conscience posited in time; but man is God,

planted or posited uninjured in time. Man is the object in the self-consciousness of God; the creatures below man are, however, the objects only of the *consciousness* of God. Thus if God places before and from himself only single qualities, there are worldly things; if, however, God in this crowd of representations attains to his own entire representation then arises Man. God is $= + 0 -$, Man $= + \infty 0 - \infty$, the animal is $= + n 0 - n$. The animals are only represented in part. The subject of self-consciousness is $= + 0 -$; the objects, however, are the numbers which are equivalent to this, being $= \infty + 3 + 2 + 1 + 0 - 1 - 2 - 3 - \infty$. Thus if all numbers, all world-elements, together with their perfections, occur in consciousness $= + 0 -$, there is a Man; if only single, and perhaps but few things, such as food, stones, &c. (with the entire exception of the celestial bodies), enter consciousness, there is an animal. They are represented only partly, or in a portion of the universe, but Man is represented wholly on in all its parts. Animals are fragments of man."—p. 25.

Forty-seven pages of this matter bring us to the following summary or retrospect, with which the *mathesis* or introductory chapter of the work terminates.

"RETROSPECT.

"208. The Triplicity of the primary act in the universe has now been completely demonstrated. The first manifestation of God is monas; to this corresponds *Gravity*, *Æther*, darkness, the cold of chaos. The second manifestation of God is the dyas; to this corresponds the æther in a state of tension, the *Light*. The third manifestation of God is the trias; to this corresponds the want of form, *Heat*. *God being in himself is Gravity; acting, self-emergent, Light; both together, or returning into himself, Heat*. These are the *three Primals* in the world, and equal to the three which were prior to the world. They are manifested tri-unity $= \textit{Fire}$."—p. 48.

I am unaccustomed to use strong expressions, but this either has or has not a meaning; it is either senseless twaddle or downright blasphemy. I incline to the first definition, but I confess myself one of those to whom the author alludes as having "neither the capacity"

to understand these "higher walks of science," "nor the desire for its cultivation." The work extends to six hundred and sixty-five pages, and is divided into three thousand six hundred and fifty-two verses consecutively numbered: some of them, as we have seen, are diffuse and argumentative; others enunciate dicta in the most terse and authoritative style: here are three examples.

"2684. Pouncing is hopping in the air."—p. 444.

I once heard of the Society's "*pouncing*" on the 'Zoologist.' I thought it alluded to gleaning the addresses of naturalists from the pages of the 'Zoologist;' to soliciting these particular naturalists to become subscribers; to circulating the Society's prospectuses sewed up with the 'Zoologist.' I thought this was the "*pouncing*" to which allusion was made, but I am enlightened now: the Society was "hoping in the air." The next verse stands thus.

"2685. Diving is hopping in the water."—p. 444.

There is another application of the term *diving* that has a plebeian reference to pecuniary matters; I have heard this very Society irreverently charged with "*diving*" into our pockets, and not giving back an adequate return. This use of the term was always vulgar, and is henceforth decidedly erroneous: "Diving is hopping in the water."

"2884. A single world is dead, so also are many."—p. 473.

How sad to think that the world is dead! There is, however, a ray of comfort in the assurance that this makes no difference to the monkeys; they are extra-mundane, and feel no inconvenience from the death of one world or many: we are assured, for our consolation, that "For the Apes there is no world; but only tree-fruits female and male." What extra-mundane entity a female tree-fruit may be I have "neither the capacity" to understand "nor the desire for its cultivation." However, it is pleasing to know that for the monkeys it answers all the purposes of a world.

Here is a specimen of Oken's poetic vein.

"Gazing upon a Snail, one believes that he finds the prophesying goddess sitting upon the tripod. What majesty is in a creeping Snail, what reflection, what earnestness, what timidity and yet at the

same time what firm confidence! Surely a Snail is an exalted symbol of mind slumbering deeply within itself.”—p. 657.

Enough of this! Let me in conclusion suggest that the Society should suspend the collection of its enormous revenue until it can find a *rational*, if not *useful*, mode of expending it. As now conducted the Ray Society is the opprobrium of Science.

The present volume of the ‘Zoologist’ fully equals those which have preceded it, both in the present interest and permanent value of its contents. In quantity of matter it far exceeds either of them, owing to the great preponderance of the smaller type.

In Quadrupeds, the discussion on the gigantic deer of Ireland (Zool. 1589 and 1620) has been pronounced by an accomplished geologist to be “of the highest possible interest.” My own opinion was so fully given in my last year’s address that I need not repeat it here.

In Birds, three important additions have been made to our Fauna. *Fuligula ferinoides* (Zool. 1778), a duck of which three undoubtedly British specimens have occurred, and which was at first figured by Mr. Yarrell as the *Fuligula mariloides* of Vigors; *Larus Rossii* (Zool. 1782), a single specimen of which was shot at Tadcaster; and *Sterna velox* (Zool. 1878), killed near Dublin in 1846. Accurate and detailed descriptions of all the three will be found at the pages to which I have referred.

In Reptiles, the communications and quotations about “the Sea Serpent” are well worthy of attentive perusal: it is impossible to suppose all the records bearing this title to be fabricated for the purpose of deception. A natural phenomenon of some kind has been witnessed: let us seek a satisfactory solution rather than terminate enquiry by the shafts of ridicule. The grave and learned have often avowed a belief that toads can exist some thousands of years without food, light or air, and immured in solid stone: surely it is not requiring

too much to solicit a suspension of judgment on the question whether a monster may exist in the sea which does not adorn our collections.

In Fishes, the papers by Mr. R. Q. Couch are invaluable: his observations on the migrations of the pilchard (Zool. 1644 and 1705) ought to be studied with the most profound attention; they are not merely interesting to the naturalist, but are of the highest importance in connexion with our national resources.

In Insects the present volume is peculiarly rich: we have many interesting and beautiful additions to our native Lepidoptera; *Cerura bicuspis* (Zool. 1863), taken near Preston by Mr. Cooper; *Lithosia pygmæola* (Zool. 1914) on the coast of Kent; *Hydræcia Petasitis* (Zool. 1914) flying over the flowers of the butter-bur; *Hadena assimilis* (Zool. 1914) by Mr. Weaver in Scotland; *Eupisteria picearia*, *Coccyx cosmophorana* and *Scardia Picarella* (Zool. 1883) by Mr. Hodgkinson in Perthshire; *Acidalia pallidiaria* and *Catoptria citrana* by Mr. Stevens at Southend; and a new *Psyche* (Zool. 1863), which he proposes to call *retiella*, by Mr. Ingall in the Isle of Sheppey. In Diptera, we have Mr. Bracy Clark's observations on the larva of the *Œstrus* of the stag (Zool. 1569): this discovery, or rather re-discovery, for Reaumur has also described and figured it, is one of great interest, and its record in the pages of the 'Zoologist' will doubtless meet the eye of some one who has the opportunity of pursuing the enquiry, and tracing the insect through the various stages of its existence: I quite agree with Mr. Clark in believing it will eventually prove identical with the *Œstrus pictus* of Curtis's 'British Entomology.' In Hymenoptera, Mr. Smith has continued his admirable and elaborate papers on bees; these, in the present volume, are confined to the numerous and very difficult genus *Andrena* (Zool. 1662, 1732 and 1916): the utility of these papers will be appreciated by those who have studied this interesting order of insects. In Coleoptera, the papers by Mr. Wollaston (Zool. 1570, 1671, 1753, 1897 and 1934) and Dr. Schaum (Zool. 1887 and 1932) are of great and lasting value. Dr. Schaum's paper on the *Hydrocanthari* shows

our culpable neglect of a branch of entomology, which, though dry, is most essential. I allude to nomenclature, and I cannot refrain from expressing my deep regret that such a mass of errors should so long have existed as have lately been detected and corrected by Mr. Walton in the Curculionidæ, M. De Selys in the Libellulidæ, Dr. Schaum in the Hydrocanthari, and Mr. Henry Doubleday in the Lepidoptera.

The past summer has rendered the entomologist an abundant harvest in some of the classes: the plan of sugaring for nocturnal Lepidoptera has been attended with great success. The locust has again appeared, and the facts of numbers having been seen on the sea-beach (Zool. 1900), others actually picked up at sea, as recorded in several local papers, and of its numerical preponderance on our eastern coast, afford important items in the history of this extraordinary insect, and leave us little room to doubt that it reaches these islands by crossing from the continent: how this is effected we have yet to learn.

The year has been rich in works on economic Natural History: from some of these I have made copious and valuable extracts, others are still reserved for this purpose. I have found these extracts as acceptable to subscribers as they are gratifying to the authors I have quoted. This plan of exhibiting specimens is the fairest that a reviewer can adopt: candid opinion is often unsatisfactory to all parties, but *verbatim* extracts convey an impression from which there is no appeal.

Once more I beg to thank both contributors and subscribers for their assistance, and to congratulate them on the success which has attended *our* united efforts. Year after year the 'Zoologist' attains a more prominent position in the literature of the country, and finds increased favour with the lovers of Nature at home and abroad.

EDWARD NEWMAN.

9, Devonshire Street, Bishopsgate,
October, 1847.

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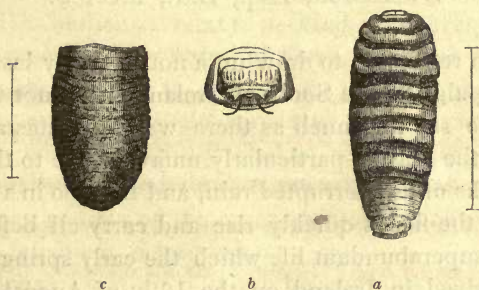
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ADVERTISEMENT.

'THE ZOOLOGIST' will be continued both as a monthly and an annual publication. As a monthly, it will contain thirty-two pages of letter-press, occasionally accompanied with illustrations engraved on wood; will be on sale three days before the end of every month; and will be charged one shilling. As an annual, it will be sold on or about the 1st of December; will contain twelve monthly numbers, bound and lettered uniformly with the present volume; and will be charged thirteen shillings. An alphabetical list, both of contributors and contents, will be published once in the year.

THE ZOOLOGIST.

FOR 1847.



a. The larva of *Æstrus Cervi*. b. Anterior extremity of the same, showing the hooks. c. The pupa, the anterior extremity having been separated.

Note on the Bot infesting the Stag.—After considerable delay, from various unforeseen causes, I am enabled to present thy subscribers with a view of the larva and pupa of the bot of the deer, objects hitherto quite unknown, I believe, to naturalists. Reaumur has indeed given a representation of the larva of this species, but it is evident, from the very elongated figure he has given of it, that it must have been dead some time, and obtained this lengthened figure from putrefaction. This larva, several of which I have had alive, so much resembles that of the *Æstrus* of the sheep, that they might be taken on a careless inspection for one another, that of the deer is, however, somewhat proportionally longer and less angular. All efforts to preserve them out of their locality in the throat of the stag seem hopeless; I have had many from the New Forest by the kindness of the Superintendent there, and though kept on membranes and fed with milk in a warm place, they uniformly died within forty-eight hours. The present specimen was so far advanced in its growth that it assumed the chrysalis state, but died in that state and never came out. Though positive proof still fail us, I am brought to the firmest conviction that the stag bot is no other than the *Æstrus pictus*, found by

my late friend George Samouelle, in the New Forest, and since taken in the same place by our very worthy friend and excellent entomologist, J. C. Dale, Esq., and as there is no bot-fly known in this country that we do not fully understand in all its states, so it brings us to the all but absolute proof that it is no other than the *Cæstrus pictus*, so called by Curtis in his excellent 'British Entomology,' and by the continental naturalists. This larva, with others, at different times was received by me by the kind aid of my worthy friend John Bolt, of Lyndhurst, assisted by the kindly interference also of the present forest-keeper and ranger, who desired any larvæ found in the killed venison to be brought to him. Any one desirous of seeing a good representation or figure of this species may consult my 'Treatise' on this genus, pl. 1, fig. 40, with nearly or quite all the other members in their respective changes of this truly remarkable family.—*Bracy Clark ; 7, Taunton Place, Regent's Park.*

Note on the Coleoptera of the South of Ireland. By T. VERNON
WOLLASTON, Esq., B.A., F.C.P.S.

HAVING been requested to draw up a notice of my last year's Entomological campaign in the South of Ireland, it is not without reluctance that I do so, inasmuch as there were circumstances present which render the season particularly unfavourable to the Entomologist. Six weeks of uninterrupted rain, and that too in a mountainous country where the floods quickly rise and carry all before them, had destroyed the superabundant life which the early spring had fostered, and when I arrived in Ireland on the 10th of August, the summer was too far advanced for me to gain, even by the hardest work, more than a rough and general outline of the Coleoptera of this interesting district. Still, having devoted all that remained of the season to my favourite pursuit, and having had opportunities of visiting, for the sole purpose of collecting, many remote parts of Kerry and Cork, I register the following observations in the full assurance that every drop which is added to the sea of knowledge, brings with it its own amount of utility, which, although it be from its smallness, inappreciable in itself, is nevertheless not without its value when mixed up in the general mass.

And, to commence, I ought to state that my first impression (on which I would lay the greatest stress) was twofold,—viz, the extraordinary scarcity of insects *in general* to that I had been accustomed to observe in England; and the large preponderance which the water species everywhere bore, in point of numbers, over the land ones.

Whether, in one broad view, these facts are to be accounted for by

the humidity of the atmosphere, which, in its extreme state, is well known to be as unfavourable to the reproduction of the strictly terrestrial insects as it is favourable to those which are aquatics, it is impossible to say; but, certain it is that this unequal distribution *does exist*, and moreover that the ratio of the existing *numbers* obtaining between that country and our own, is so extraordinary, that I am convinced that St. Patrick, when, in the sublime words of the Poet,

He drove the frogs into the bogs
And smother'd up all the *varmin*,

must have included under the latter head, not only its strict and legitimate members, but a large variety of creatures, which to admit within its precincts, verily Entomologists would be indignant!

My first centre of action was Killarney. Here, as well as in the other neighbourhoods, the water-insects stood pre-eminent. The Lakes themselves harboured next to *nothing*,—but every river running into them, (especially the beautiful Flesk, of which I cannot speak in too high terms whether as regards its entomological productions or its scenery), every mountain tarn and every little stream in the whole vicinity where positively choked with Coleoptera, albeit the *species* were but few. From those captured in the river Flesk, which is a fair average example of the other streams, I would select the following, which inhabit it in profusion:

Haliphus fulvus	Laccophilus minutus
———ruficollis	Gyrinus natator
———lineatus (<i>Aubè.</i>)	———substriatus
Hygrotus collaris	———lineatus
———reticulatus	Parnus prolifericornis
———inæqualis	Elmis Volkmar
———scitulus	———parallelipedus
———pictus	Helophorus granularis
Hydroporus depressus	Enicocerus tristis
———12-punctatus	Octhebius pygmæus
———alpinus	Hydræna riparia
———tristis ?	Limnebius ater
———rufifrons	Laccobius minutus
———ovalis	———ochraceus
———nigrita	———globosus
———palustris	Philhydrus melanocephalus
———erythrocephalus	

And it is curious to observe how almost exactly they coincide with the species noticed by Mr. Haliday in the north of Ireland, in the stream between Toome Bridge and Lough Beg.

In the mountain tarns the species were even less numerous,—nevertheless the number of *specimens* was prodigious. On the mountain called Cromaglaun, about six miles from Killarney, (on which in a former number of 'the Zoologist,' I described having taken that very rare and beautiful little shell, the *Amphipeplea involuta*) I was greatly struck at the enormous quantity of specimens which these small alpine lakes produce. Nevertheless the only *species* I could discover were the following, which are pretty much the same as those which are found in all the similar positions: *Hygrotus scitulus*, *Haliplus lineato-collis*, *Hydroporus palustris*, *erythrocephalus*, *rufifrons* and *nigrita*, *Laccobius globosus*, *Gyrinus substriatus* and *marinus*.

If we turn to the *land* species of this district, we at once find the great preponderance which the commoner *Geodephaga* display,—a race which, next to the *Hydradephaga*, rank undoubtedly foremost in point of numbers. For instance under the large blocks of stone and at the damp roots of the trees on the sides of the mountain, we find abundance of *Cychnus rostratus*, *Helobia brevicollis*, *Agonum parumpunctatum*, *Badister bipustulatus*, *Synuchus vivalis*, *Omaseus nigrita*, *Harpalus ruficornis*, *Argutor vernalis*, *Trechus minutus*, *brunripes*, and the like. On the banks of the Lower Lake a very interesting insect occurred to me, but unfortunately I could only obtain a single specimen. This was the *Nebria borealis*. Mr. Haliday has been accustomed for some years past to capture it in the north of Ireland, on the sandy shores of Lough Neagh, which was I believe the only recorded locality in the United Kingdom, having been first discovered by Mr. Patterson. It is therefore with much pleasure that I find it so far south as the Lakes of Killarney. Being at the time unacquainted with the insect and taking it for a small specimen of *Blethisa*, I had placed it in my cabinet under that name without examination. It would have there remained in obscurity had not my attention been called to it by Mr. Haliday a short time ago, who kindly sent me examples from his northern locality and pointed out the distinctions. I was also much gratified at finding the remains of my old friend *Cossonus Tardii* in this remote locality. Near the old Weir Bridge, at the entrance of the channel at the Upper Lake, are a quantity of decayed hollies,—several of which I found infested with the dead carcasses of *Cossonus*. It is a singular fact that this insect has not yet been discovered in any part of the continent of Europe.

Ireland was the original country in which it was observed, and the discovery is due to Mr. Tardy of Dublin, who procured it from decayed hollies at Powerscourt Waterfall in the county of Wicklow. I believe *I* had the pleasure of first recording it as an English species, having found it (Zool. 702 and 775) in considerable abundance on the coasts of Devonshire and Cornwall in the summer of 1844.

Of my other captures I record the following, not on account of their rarity, but merely to give a general idea of the species which are found more particularly abundant in this immediate locality.

Peryphus atrocæruleus	Sitona canina
Cercyon melanocephalum	Apion curtirostre
—————stercorarium	—————Loti
Meligethes viridescens	—————carduorum
Micropeplus porcatus	—————hæmatodes
Aphodius contaminatus	—————flavipes
Cyphon Padi	Donacia cincta
—————Pini (<i>Curtis.</i>)	Haltica Pseudacori
Rhinusa tricolor	—————exoleta
Sphærulea Lythri	Thyamis ochroleuca
Nedysus Cochleariæ	—————lurida.
—————Ericæ	Macrocnema affinis
Phytobius velatus	Blaps mortisaga
Anoplus plantaris	Tachyporus hypnorum
Anthonomus pedicularius	—————nitidicollis
Otiorhynchus singularis	Philonthus marginatus
Sitona regentsteinensis	Stenus levior
—————lineata	Platysthetus sulcatus
—————tibialis	Oxytelus depressus.

The banks of the river Flesk are the best collecting grounds in the vicinity of Killarney, and that portion of them between Flesk priory and the shores of the Lower Lake I found by far the most productive.

At Glengariffe in the county of Cork, I met with tolerable success but, here, as in all the other maritime localities, the *Brachelytra* occupied the largest portion of the insect community. The damp woods at the head of Bantry Bay produce an abundance of the commoner *Geodephaga*,—and I here for the first time met with *Phosphuga subrotundata*,—an insect so common in many parts of Ireland, though not yet recorded as an English species. The following short list will give a fair idea of the few insects with which these unproductive woods more particularly abound :

Helobia brevicollis	Aphodius fimetarius
Agonum parumpunctatum	Otiorhynchus sulcatus
Badister bipustulatus	Lagria hirta
Synuchus vivalis	Astenus angustatus
Argutor vernalis	Oxytelus nitens
Omasus nigrita	—————depressus
Harpalus latus	Platysthetus sulcatus
Trechus fulvus	Rugilus orbiculatus
Notiophilus striatus	Lathrobium punctato-striatum
Laccobius globosus	Staphylinus æneocephalus
Cercyon laterale	Xantholinus linearis
—————atomarium	Raphirus semiobscurus
—————minutum	Quedius impressus
—————stercorarium	Tachyporus chrysomelinus
Aphodius prodromus	—————subtestaceus.

Further inland the county of Cork opens a far richer field to the entomologist. Leaving the bare, uncultivated tracts of Kerry (as unproductive as they are beautiful) greater fertility abounds, and along with it, civilization, comparatively speaking, strides apace. The immediate neighbourhood of Cork I had but little time to explore, and nothing in any way uncommon occurred to me. The exertions, however, of my friend Mr. Clear, have satisfactorily proved the locality to be a good one; and it is to him that I am indebted for a new and very beautiful *Hydroporus* (which I hope shortly to describe under the specific name of *trifasciatus*), captured in the river Lee, near that city. The rare and interesting *Melolontha Hippocastani*, already alluded to in the 'Zoologist,' he informs me he has been accustomed to take sparingly near Bandon; from which locality I am indebted to him for specimens of water insects, including *Elmis Volkmaria*, *variabilis* and *parallelipipedus*, species which throughout the whole of Ireland appear to be unusually abundant. *Otiorhynchus Monticola* (*German*) also I possess from the same locality.

The neighbourhood of Kanturk produced me a far richer harvest than I reaped in any other part of Ireland. At Rosnalie, the seat of W. Leader, Esq., I had a good opportunity of investigating this unexplored district. Situated on the river Blackwater, and surrounded by a variety of soils, few spots in Ireland which I saw opened a wider and more extensive field for Natural History in general. Amongst many well-known species, and many obscurities, which are yet to be determined, I record the following as characteristic representatives of

this interesting locality ; all of which, with one or two exceptions, occurred in considerable abundance :—

Blemus paludosus
 Hygrotus scitulus
 Hydroporus 12-punctatus
 ——— alpinus
 ——— palustris
 ——— planus

Gyrinus natator
 Hydræna riparia
 Limnebius ater
 ——— truncatellus

Laccobius globosus
 Cercyon Boletophagum
 ——— laterale
 ——— contaminatum

Ephistemus gyrinoides
 Leiodes thoracica
 ——— rufipennis
 Agathidium badium (*Erich. ?*)

Clambus Enshamensis
 Orthoperus nigrescens
 Meligethes nigricornis ?
 Micropeplus staphylinoides ?

Trichopteryx atomaria ?
 Anisarthria minutissima ?

Atomaria phæogaster
 ——— atricapilla
 ——— atra
 ——— nigriventris

Latridius lardarius
 ——— transversus

Corticaria longipennis
 ——— ferruginea
 ——— transversalis

Byturus tomentosus
 Monotoma augustata
 Cryptophagus cellaris
 ——— Ulicis

Aphodius contaminatus
 Cyphon Padi

Nedysus Erysimi

—— contractus

—— troglodytes

Notaris acridulus

Hypera Rumicis

—— nigrirostris

Otiorhynchus singularis

Sciaphilus muricatus

Strophosomus obesus

Sitona canina

—— subaurata

Apion hæmatodes

—— Hydrolapathi

—— carduorum

—— virens

—— Ervi

—— Loti

—— flavipes

—— apricans

—— Viciæ

—— Gyllenhalii

Sphæriestes immaculatus

Crioceris cyanella

Thyamis tabida

—— melanocephala

—— fuscescens

Sphæroderma testacea

Phædon tumidula

Coccinella variabilis

—— 18-guttata

Rhyzobius litura

Lagria hirta

Anthicus fuscus

Tachyporus chrysomelinus

—— hypnorum

—— nitidicollis

—— libens

—— merdarius

—— collaris

Tachyporus subtestaceus

Tachinus pullus

Stenus nanus?

—— lineatulus

—— impressus (*Erich.*)

—— picipes

—— bupthalmus

—— circulator (*Gyll.*)

Xantholinus glabratus

Platysthetus sulcatus

Megarthrus retusus

Othius melanocephalus

—— fulvipennis

Syntomium æneum (*Müll.*) =nigroæneum (*Curtis*).Quedius obliteratus (*Erich.*)

Hypocyrtus læviusculus.

At Castle Cor, not far from hence, I met with *Trachyphlæus Waltoni* (*Schön.*) and two species of *Rhyzophagus*, *viz.* *ferrugineus* and *cribratus*. From the extreme difficulty of naming the smaller *Brachelytra*, I have omitted noticing many species which would otherwise be of interest. Nevertheless, the preceding remarks will, I trust, give *some* idea of the *Coleoptera* more particularly abundant throughout this extensive district. At some future time (not far distant) I hope to have better opportunities of investigating this portion of its Entomological Fauna, and adding further observations on the result of my researches.

T. V. WOLLASTON.

Jesus College, Cambridge.

On the Feeling of Insects. By the REV. WILLIAM TURNER, M.A.

I HAD no intention of recurring to the subject of impaled *Lepidoptera*, but as Mr. Wollaston has stated, in the last number (*Zool.* 1556) he was not aware of what I had written (*Zool.* 1342) at the time he penned his communication (*Zool.* 1434), it is quite clear that his observations could only have an *accidental* reference to mine; and, therefore, I feel it right to apologise to him (which I readily do) for having erroneously supposed that the allusions were *designed*. I confess that I regarded his communication as an attempt to ridicule the notion that a *Noctua* could be impaled without causing it pain.

Having said thus much, I will—as Mr. Wollaston has shown that the subject is not so unpleasant as I had imagined—pursue it a little further, that I may notice some considerations which I am taxed with having left out of the question. These, if I understand aright, are—slow circulation in insects; this circulation retarded by sleep; vital force diminished by sleep; and analogy.

Now what I advanced at first, and still maintain, is, that the struggles of impaled insects cannot proceed from pain. All Mr. Newman's instances, so opportunely published, strongly corroborate this position. My prejudices were once so strong in the opposite direction that, for some time, I ceased to be a collector: it was mere chance that led me to examine the matter more closely; and I now impale an insect without any serious compunction.

I confined myself to Nature, and observed facts. I found—that nocturnal Lepidoptera which sit with their bodies close to the substance on which they rest, may be impaled, and remain motionless, for hours, I believe the whole day; that at night, when they would begin to fly, they struggle, and probably continue to do so, more or less, through the night; that the next day they are perfectly still again; and so on alternately: that in diurnal Lepidoptera the reverse takes place; *they* struggle in the day, whenever the sun's rays are admitted to them, and remain quiescent at night: that if an impaled Noctua be roused during the day, and the pin be then withdrawn, the insect, for the most part, immediately composes itself as if nothing had happened: that nocturnal Lepidoptera are with more difficulty impaled, and more easily roused, according as they sit, when in repose, with their bodies more or less raised from the substance on which they rest. I have rarely been able to pierce any species of *Triphæna*, and never could succeed with any of *Eudorea* or *Pterophorus*. This brief recapitulation is necessary, for the purpose of (by and by) testing the results by analogy.

I have very carefully read, and have been very much amused—even at my own expense—with Mr. Wollaston's interesting communication; but I do not find that it contains anything to disprove the conclusion which I have drawn, though I do find myself charged with leaving out of the question several important considerations. A great deal of it—however interesting in other respects—has, I think, nothing to do with the question at issue.

I do not, indeed I *dare* not, *deny* a sense of feeling to insects; but, I believe, I have never *admitted* it in the 'Zoologist:' a point on which Mr. Wollaston has fallen into error. I said—"neither do I deny that insects do not feel at all;" but Mr. Wollaston makes me admit that they feel: which two expressions are not *quite* equivalent. Not to deny any proposition simply implies that it may be true or false; that, in fact, I know nothing about it: but to admit a proposition implies that I have good reasons for believing it to be true. For instance, I might not deny that the moon is made of green cheese,

without admitting that it is, Daniel O'Rourke being the only person of whom I have read who has had an opportunity of deciding this point, and he, most provokingly, has left the world in ignorance of that interesting fact.

I will, however, admit that insects *can* feel, because I have seen quite sufficient to satisfy my mind on *that* point; but, even then, I cannot follow Mr. Wollaston to his conclusion in the following: "Mr. Turner allows that insects feel, and yet he assumes that this sensation is not produced by their being impaled. Now if the first (allowance) be correct, the second (assumption) must be erroneous." Why? I had been speaking of pain, and in precise language I ought to have written 'sensation of pain' in this place; but suppose 'sensation' to mean 'feeling,' as Mr. Wollaston makes it, and my words will be—"I allow that insects feel; but I contend that this feeling is not produced by their being impaled." Certainly not—for if insects possess the sense of feeling at all, they possess it before they are impaled; and, therefore, it is not an error to say that it is not produced by their being impaled. This, however, is rather puerile. I really meant 'sensation of pain.'

There is another instance which—from my language not being sufficiently guarded—has afforded Mr. Wollaston a good deal of argumentation, *viz.*, where I said, "Impale an insect, and wait until it is roused." My meaning would have been better expressed by saying, "Impale an insect, and rouse it in the day-time;" but then we should have lost Mr. Wollaston's pleasantry.

I cannot see anything "unnatural, and therefore erroneous," in supposing that an insect may feel pain under some circumstances and not under others. And I may just mention, that those *Noctuæ* which do not rouse when pierced through with a pin, are often easily roused, from *apparently* less sufficient causes. If the antennæ be moved by a pin from their quiescent state, the moth will for the first time, perhaps, merely withdraw them to their former position: if this be done a second time, it will probably strike out its foot at the pin, and show a little irritability; and by repeating the process, it will become thoroughly roused, though no wound has been inflicted. Again, if the leg of a sleeping *Noctua* be pinched with a pair of forceps, it will soon give evidence of feeling.

Let me now observe, that Mr. Guyon's bottle of steamed Coleoptera, and Mr. Wollaston's hot plate of insects of different orders, however funny their antics may be, are beside the present question, and belong to the *general* question of insect sensibility. Mesmerism

too, and hybernation, are equally irrelevant. Neither is the lady who swallowed the pin a case in point, for I was glad to find that her pain does not return at intervals, as it does to impaled moths, if struggles imply pain.

Reject, then, these and other extraneous matter, and little will remain to be noticed beyond what I have already stated, *viz.*, slow circulation, diminished vital force, and analogy.

Now if, as I suppose, vital force means vitality, I must say that I cannot admit that it is diminished during sleep; because I do not consider that an insect is less alive when asleep than when awake, though there may be fewer signs of animation.

As to circulation during sleep, I am told by those who ought to know that in the human frame there *is* a difference, but so little that it is barely perceptible; and therefore, in all probability, the difference is not very great in insects.

I believe it is an established fact, that the circulation in insects is slower than in man; but I suppose it is pretty much the same for the same order of insects—Lepidoptera for instance. If, then, this be the cause of their remaining quiet when impaled, how is it that some find out their unpleasant situation so much sooner than others?

Analogy I purposely passed over, because I was not sure that the manner in which pain is produced in man is analogous to that in insects; in fact, I thought it could not. Had I thought it is, I should most assuredly have impaled Mr. John Smith, or some other luckless wight, merely to confirm what I had arrived at from other considerations.

I fully admit the analogy between the legs and eyes, because they evidently have similar functions in both; and if either man or insect were deprived of legs, the power of walking would cease: so, also, the loss of eyes in either would be attended with the loss of sight; and *probably*, for I cannot speak positively, if a man were deprived of half his nerves he would die in agony under the operation, and yet there appear well-authenticated instances of insects losing the greater part of what is called their nerves, without *appearing* to experience any very great inconvenience.

To these I may add the following extraordinary case, which occurred to myself last month. I found an example of *Xylina Lambda*, which I took home, and pierced the underside of the thorax with a quill, dipped in a solution of oxalic acid, as strong as it can be made. This generally produces almost instant death, which I believed to be the case in the present instance, for all the legs were drawn up, and

every appearance of life was gone. After a short time, five minutes perhaps,—but I did not note the time, as I was not prepared for what followed,—I removed the pin, in order to insert it underneath, preparatory to removing the inside, as I find this species often becomes *greasy*. The moth was perfectly motionless, and I thoroughly cleared its body, and put into it some Fuller's earth to absorb any remaining moisture; during all which operations I did not perceive the least movement in any part. I again took out the pin, that I might insert it properly for stretching the insect, when to my utter astonishment it walked across the table! I do not require any one to believe this, because I well remember, some years ago, withholding my belief from a very similar circumstance related to me by a friend—and yet it is true nevertheless.

If Mr. Wollaston will concede to me an analogy in the manner in which pain is produced in man and insects, I will most readily avail myself of it. First thanking him for warning me against denying the existence of analogy, and assuring him that the reason why I did not employ it in the case under consideration was, that I felt I might be asked to show that there existed any analogy between the manner in which pain is communicated in man and insects, which I was sure I could not.

I was therefore particularly pleased to find Mr. John Smith impaled, whilst asleep against a tree, by a large iron bar, because I thought that if he were an ordinary sized person the iron bar in him would bear a tolerably fair proportion to a pin in an ordinary sized *Noctua*. In this predicament we are told that Mr. John Smith instantly awakes and kicks vigorously; and I have not the least doubt of it. Very well: next suppose John recovered, and asleep again; and, after having procured a suitable bottle, put him into it, and then plunge the bottle into hot water, and, my word for it, he will kick there too.

Now take a sleeping *Noctua*, and, without rousing or impaling it, put it quietly into a bottle, and plunge the bottle into hot water, and I know, from experience, that the insect will immediately awake, and plunge about as vigorously, *cæteris paribus*, as John did. But this insect was not impaled; therefore impale another sleeping *Noctua*, and, fixing it on a piece of cork, put it into the bottle, and mark the difference in time when the struggles of the two insects commence; and I imagine the difference will be inappreciable. It would be useless, after impaling, to bottle John, and subject him to the same process as the impaled insect; because we have seen that he would kick before, and he could only kick afterwards.

So far, then, there does appear an analogy of feeling between man and insect. But I find that the moth when impaled on the tree does not struggle; and therefore, if the analogy hold, I cannot for the life of me see why John should kick so at being impaled—he must have been *shamming*.

And it seems rather surprising that this did not occur to Mr. Wollaston, but—I forget—there is the slow circulation. It is true this circulation appeared quick enough when the impaled insect was put into a bottle, and the bottle plunged into hot water; but then we may *imagine* that this was the result of an increased temperature.

Now, take any other of the Smith family, when asleep, and impale him with an iron bar, and when he begins to kick release him; and I very much fear he will not at once quietly compose himself, as if nothing had happened, which I find to be *generally* the case with impaled moths. Neither would he alternately suffer by day and be at rest at night, as moths, *mutatis mutandis*, do if struggles indicate pain.

Would it not then appear, either that the struggles of impaled moths do not proceed from pain, or else that there is no analogy between the communication of pain in man and insects, and, consequently, that the test is inapplicable?

I feel an interest in collecting such Lepidoptera as fall in my way, and try to learn something of their individual history; but I am no scientific entomologist, and know nothing of the discoveries that may have been made in the nervous system of insects. With regard to man, it is, I believe, an established fact that the nerves are the means of communicating feeling; but I am not aware that any such connection has been satisfactorily traced between feeling and what are called nerves in insects—but I speak under correction. Could anything at all similar to what I have mentioned of *Xylina Lambda* have occurred to Mr. John Smith or any of his family? But—

“ne sic, ut qui jocularia, ridens
Percurram; quanquam ridentem dicere verum
Quid vetat?”

I will briefly state that I have endeavoured to consider the subject impartially, and view it in a broad light: had I been captiously inclined there was an ample field before me, but I am not, my sole object being to state fairly the result of my observations, and discard everything that appeared irrelevant, without the slightest wish to influence the judgment of any one, beyond what these observations may seem to justify.

Trusting that Mr. Wollaston, if he reads these remarks, will receive them with the same good humour as they have been written in, I take my leave of the subject, just observing that had I foreseen that the few remarks which I made on Mr. Dawson's note (Zool. 1240), with a view to prevent what I *believed* an erroneous impression, would have resulted in such a lengthy discussion, they never would have appeared in the 'Zoologist.'

WILLIAM TURNER, M.A.

Uppingham, Dec. 10, 1846.

Thoughts on the Disputed Sensibility of Insects.

By H. N. TURNER, Jun., Esq.

BEFORE adding to the various observations which have appeared in the 'Zoologist' on insect sensibility, I must observe that I wish to do so on perfectly independent grounds; in fact, I forwarded my first communication towards the latter end of last month, and after reading Mr. Wollaston's able article, in answer to the Rev. Wm. Turner, immediately felt tempted to substitute a more explicit statement of my hitherto unpublished ideas; but as I feared lest I should be supposed desirous of interfering with the controversy between the above-named gentlemen, with neither of whom have I the honour of acquaintance, it is not without considerable hesitation that I have done so.

Let us first of all endeavour, in our reflections on this extremely difficult subject, to divest ourselves of all ideas founded solely on those natural directions of our thoughts, which result only from our bodily and habitual sensations: it is also necessary that we banish from our minds the idea, that certain bodily indications, which frequently accompany a sense of pain, cannot proceed from any other source. Having done so, we find that we have no more reason for supposing that insects feel, than we have for receiving any of such prevailing popular notions as are held solely on account of their early and unknown origin. We have, therefore, only for our guide, in the attempted solution of the problem in question, the accurate observation of facts, and whatever clew physiological principles as yet give us to the interpretation of their meaning. Sensation, as anatomical investigation has shown, depends on the presence and disposition of a soft substance termed neurine, whose chemical constitution approaches in some degree to that of fat, but which plays in the animal

body a most important part, being the sole communicating medium between the various organs and the directing mind and instincts, conveying to the latter the indications of external bodies and forces, and from it the commands by which every muscle acts in harmony for the production of the different organic functions and voluntary movements. I am here compelled to express my opinion, that in supposing neurine and sensation to be absolutely inseparable, Mr. Wollaston has fallen into a most unaccountable mistake. I would beg to refer him to the works of the celebrated Sir Chas. Bell, whose discoveries, together with those of Dr. Marshall Hall, on the reflex function, rank as the most important in that very obscure branch of physiology. Sir C. Bell discovered that no one simple nerve possesses more than one of the many functions which neurine is capable of exercising; that even a nerve which conveys both power and sensation arises by a double root, and therefore consists of two nerves rather than of one; moreover, that one of these roots springs from a distinct tract of neurine extended all down the spinal cord; and that, by dividing one or other of these roots, he could deprive that portion of the body to which the nerve is distributed, either of motion or sensation; also, that in some parts, as in the face for example, the nerve which communicates sensation has its origin far removed from that which gives the power of motion to the same part of the body. This I think all must acknowledge is a satisfactory proof that neurine and sensation are by no means necessarily connected; indeed, although the latter presupposes the existence of the former, the converse can no longer be maintained. Let us now consider more particularly what is implied by the word sensation or bodily feeling: it appears to me that under this term have been confounded a multitude of varied perceptions which the animal body has of things external to it;—the delicate sensation in the skin, by which we recognise the presence and characters of an object with which it is in contact; the sensation of resistance felt when a limb is moved through a dense medium, or pushed against a solid which yields not to its action; the pricking pain (existing only in the skin), which is Nature's kind warning, lest the intrusion of a pointed body should harm the organisms beneath; a blow which, though scarcely felt on the softer flesh, when received on a projecting bone thrills through it with agonizing pain; the sensation of heat or cold, alike perceived when the body causing it is applied to the outer skin, or swallowed into the stomach;—all these perceptions, the different warnings against varied dangers, have been grouped together under the one comprehensive name of feeling. They are but few of the dif-

ferent sensations daily affecting us, and each in its own place necessary for our safety and existence. Let us now reflect which of them are most necessary to that of an insect, and whose presence is most compatible with what we know of the structure of its parts. An insect, enclosed in a horny case, does not need, and indeed could not possess, that perception of pricking which exists in the higher soft-skinned animals: such a sensation does not exist invariably even in the human species, as the exit of many needles from various parts of the body of a lady who had swallowed them, causing no pain until they approached the surface, abundantly testifies. And further, is it probable that an insect would be endowed with a sensation, rendering it liable to a pain which for purposes of protection would be useless? Consider its internal structure; there is no single central heart driving the blood in closed vessels through insulated lungs, as the blood, after being driven towards the head by the lengthened and many-parted dorsal vessel, finds its way back through capacious venous sinuses, which scarcely confine it, so that even the alimentary canal and secreting organs float loosely in the ambient fluid; and as the system of respiratory organs is distributed in multiplied ramifications throughout the entire body, there is not the slightest danger of that suffocation which in higher animals must result from internal thoracic hæmorrhage; also from the constitution of the main trunk of the nervous system, of two thin filaments connecting ganglia, which are protected by inward processes of the envelope, but little danger can accrue to it. May we not thus account for that total absence of injury from an impaling pin, which so many experiments have testified? And again, I ask, is it probable that such a sensation as that of pricking would be imparted to protect from an injury existing only in those imaginations of our own, which I have at first suggested the propriety of shaking off? But the insect must experience the feeling of resistance, or it cannot know when it has the power of moving on its legs: this feeling is probably most acute in the antennæ, which it so frequently moves about, to ascertain the presence of near objects; and perhaps in those where the antenna has at its end a soft substance, there may be also a perception analogous to that delicate one existing in our finger-ends. An extreme of heat or cold may cause an insect's death: this sensation, confined to no part of the body, may also here exist, and warn it of such a danger, thus causing the terrible anxiety manifested when escape is rendered impossible. I have occasionally witnessed this phenomenon, but never reflected on its probable cause, until the enquiry suggested by Mr. Guyon's experiments (which I am happy to

find confirmed by Mr. Wollaston) met my eye. The oyster and the zoophyte, though we cannot perceive them to have eyes, are sensible to the influence of light; and Dr. Burmeister mentions, that some blind pupæ, which habitually lie under ground, kick violently when brought to the light: why, then, if we suppose insects to be deprived of many sensations, should we deem them also devoid of the feeling of heat?

I hope, from my foregoing observations, I may not be suspected of abiding too much by theories and speculations, but that it may be perceived I have advanced them only to account for well-attested facts; and I may conclude by remarking, that whatever facts may yet be observed, and whatever acumen be employed in their interpretation, a strong probability is the utmost we can ever attain.

H. N. TURNER.

1, Upper Belgrave Place, Pimlico,
16th December, 1846.

[As Editor, I beg to say that I think it now time that the protracted discussion on the pain felt by an impaled insect should close. The question is one of great interest, involving as it does the more important one, "Are we guilty of cruelty in impaling a living insect?" A great deal of time and space has I think been lost through the admission of extraneous matter. The subject was introduced thus by the Rev. J. F. Dawson: "In that box were a number of beetles, *impaled alive on pins*, writhing and struggling (I say) in agony." (Zool. 1240). The Rev. W. Turner, adhering closely to the question whether these strugglings and writhings do proceed from agony, announces that the conclusion at which he arrives is *that they do not*. (Zool. 1342). Now the proper way of pursuing the subject subsequently to this, would have been to search out facts, showing the conduct of insects when in a state, in which, by every relation of analogy, we may imagine them to be suffering pain. I could mention excellent instances, but the 'Zoologist' supplies two sufficient ones. *First*, the conduct of beetles in a hot bottle (Zool. 1526), and, *secondly*, the conduct of all orders of insects on a hot plate (Zool. 1558). These are instances to which the supporters of Mr. Dawson's view *must* assent, because adduced by themselves; and to which the opponents of Mr. Dawson's view *will* assent, because confirming their opposition. Now, admitting the actions in question to result from pain, every entomologist *knows* that impaled insects exhibit no such actions: those who are not entomologists may compare the conduct of insects, as described

in the passages cited (Zool. 1526 and 1558), with that of impaled insects as described by the Rev. Mr. Turner (Zool. 1342) and by myself (Zool. 1525). The result must be, the conclusion that no tittle of evidence has yet been adduced in support of the Rev. J. F. Dawson's assertion, that impaled insects writhe and struggle *in agony*: indeed all recorded facts furnish direct evidence *against* that assertion. The discussion has not been without its advantage, for I find that many of my correspondents who fully embraced the Rev. Mr. Dawson's view, and felt acutely the pang which they supposed themselves inflicting on insects, have now satisfied themselves that those views, although originating in the purest feelings of humanity, and therefore entitled to our highest respect, were nevertheless *unsupported by fact*. I will conclude with a few appropriate words from Herschell's 'Preliminary Discourse.'—"Experience once recognised as the fountain of all our knowledge of Nature, it follows that, in the study of Nature and its laws, we ought at once to make up our minds to dismiss as idle prejudices, or at least suspend as premature, any pre-conceived notion of what might, or what ought to be, the order of Nature in any proposed case, and content ourselves with observing, as a plain matter of fact, what IS."—p. 79. *Edward Newman.*]

Notes on the Lemur Catta or Ring-tailed Lemur.

By GEO. A. THRUPP, Esq.

THIS little animal, a native of Madagascar, and called there makkak or mococco, came into my possession in last October (1846). It was bought at the Cape for twenty-six shillings, being considered, even there, rare and valuable. It used to run about the ship in which it came to England with two others of the same species, and was fed principally on ship's biscuit, well soaked in water and sweetened with sugar. It drank a great quantity of water, and would not eat much at once. At night the lemurs usually slept curled up together, or in the sailor's hammocks. They would wake early, and run to greet the sunrise, sitting one behind the other, with their arms extended widely to catch all the warmth of the sun. In playing among themselves, they would fight sitting on their haunches, and cuffing with their fore paws like the kangaroos. The lemurs are powerful for their size, and my specimen, once seeing a half-grown cat sleeping in a boat along-

side, caught it up by the nape of the neck, ran up the side, holding it at arm's length, and threw poor puss, in spite of her struggles, down the hatchway. When in my possession, I took the lemur to the inn, and left him tied to the bed-post, but in the evening the chamber-maid came down much frightened, declaring there was something black in the room, sitting on the bed like a Christian, chattering at her. Now I have him at home, his usual position is on his hocks, like a squirrel, with the tail curled round in front and over the left shoulder, the head sunk; but when before the fire, it will stand on its feet, with his tail stretched out behind or up, squirrel-fashion and S-shaped, or he sits on the edge of the fender with his legs out (like a man on a chair), his arms spread, and his little head moving restlessly about: the first day or two, indeed, he was so taken up with looking at the new objects around him, that he frequently over-balanced himself and fell off his seat. He eats dry bread (holding a slice in one hand, and biting off a small piece at a time), biscuit well soaked, fruits of all kinds, cooked, raw, or dried, cooked fish and meat; the latter, however, but rarely. I am told that he will catch mice very well, but I have not had the opportunity of trying him. He also eats the seeds, fruit, flowers and leaves of fuchsias, geraniums, marygolds, and other plants, and will drink sometimes a pint of water per day. When out in the park, where I occasionally take him, he enjoys himself greatly, bounding often only on his hind legs over the grass, or cantering along the paths, stopping to eat the shell gravel lately laid down there. When loose, my lemur rushes round the room, leaping from picture to picture very rapidly, and climbs the doors and architraves by placing his hands one on each side and jerking up: the noise made by this resembles that occasioned by the use of new India-rubber on paper. He will hang by his fore paws, and move along the top of the door; in fact, all his actions and movements resemble those of the squirrel and monkey, but without the spiteful and mischievous propensities of the latter animal. This lemur never scratches or bites. He will chatter peevishly, like a squirrel, when teased, but his note of satisfaction is a low grunt, increasing in sound when in rapid motion; occasionally, though rarely, he will mew until he makes himself hoarse. This little animal is very fond of being caressed and combed, and will run to his friends, and hold out his arms to be taken up and nursed, when he will lie quietly in the lap, or under the coat, and cling tightly if any one attempt to remove him. He is very inquisitive, and will watch for the cupboard's opening, to run in, and try and steal gingerbread and sugar, and if the keys are left in he will pull at them to open it.

He is not at all of civilized or cleanly habits, however, which is his only failing, and he therefore requires constant watching to be an agreeable parlour companion, and I have hitherto failed to instil better manners into him; any chastisement only makes him peevish and shy. He is fond of licking himself, or the face and hands of those that caress him,—well-cleaned boots and coals have also a great attraction for his little rough tongue,—and, aided by his lower front teeth, he soon licks away the skin. One unlucky midshipman, who lay down (without tying him up) in the berth, had the skin taken off his nose and part of his forehead by the lemur's mode of showing attachment. In size he is about as large as a small cat, but his hind legs and tail much larger: the length of his tail is $21\frac{1}{2}$ inches; from the tip of his nose to the root of his tail $15\frac{1}{2}$ inches; girth of barrel $10\frac{1}{2}$ inches; length from inside of armpit to tip of fingers $8\frac{1}{2}$ inches; length of legs, from fork to end of toes, $12\frac{1}{2}$ inches. The colour of the fur on the back, sides, and outside of legs and arms, is brownish-gray, blending into iron-grey on the neck and crown of the head: this fur grows very thick and long on a gray-blue skin, each hair being the same colour at the root, brown in the middle, white and black at the tip. The fur on the throat, face, cheeks, ears, belly, and inside of the legs, is dirty-white, and long but thin. Round the eyes is a dark gray circle of fur; the muzzle, palate and lips are black; the tongue red. The tail is ringed, black and dirty-white, and is not prehensile. The fingers and thumbs are long and well padded, with nails to all but the fingers of the feet, which have short claws like a cat; these, the palms of the hands, and part of the wrists, are black, and have the appearance of velvet. There are four front teeth in the upper, and six in the lower jaw, four canines, and twelve grinders. The eyes bright hazel and prominent, with a small pupil, not contracting. My specimen is evidently young, as an adult at the Zoological Gardens is a third larger, and has less brown about the fur, and the parts here described as dirty-white are in it snow-white. The brown and black lemurs are still larger than Lemur Catta.

GEO. A. THRUPP.

1, Hyde Park Place, West,
Nov. 25th, 1846.

On the discovery of the Bones of Extinct Deer, &c. at Lough Gùr, in the county of Limerick. By RICHARD GLENNON, Esq.

BEING a constant reader of the 'Zoologist,' and finding in it so many curious and interesting communications on various branches of Natural History, I am induced to trouble you with a few facts that have lately come under my notice. Having occasion a short time since to visit Limerick, in company with my friend, Mr. Nolan, we embraced the opportunity which the journey afforded us, of searching for the remains of that most interesting animal which has been so often misnamed the "fossil" or antediluvian deer of Ireland, and the particulars which resulted from our labours, and which I am about to detail, will, I trust, throw more light on the period of its existence than anything previously published on this interesting subject, and will thoroughly establish the fact of its having been slaughtered by man for his use and food. The history of this remarkable animal has hitherto been taken only from the hear-say of common labourers, who on finding the bones, threw them indiscriminately in a heap on the nearest bank; and as they were always found mixed with the bones of other animals, as the red-deer, and cattle of various breeds and sizes, it can scarcely be wondered at that so many errors have occurred in selecting bones to complete the skeletons supplied to various public institutions. I have learned that the skeleton of a cow was made up from a heap of these bones, and sold to a public body in London as that of the female giant-deer, and the mistake was eventually detected by a talented officer of the institution.

We searched and dug wherever the slightest trace of information respecting the presence of bones could be obtained, and in one instance, our efforts were attended with the most eminent success. We found the bones of five varieties of the cow or ox, five of the deer, two of the goat, and two of the hog or pig, together with those of the hare or rabbit, swan, goose, duck, turkey, and of several game birds. The tusks of the boar were so numerous that they might be shovelled up like gravel in a gravel-pit.

The skulls of all the large animals were broken in by some sharp and heavy instrument, and in the same manner as butchers of the present day slaughter cattle for our markets, and in many instances the marrow-bones were broken across, as if to get at the marrow. Such was the enormous quantity of these bones, that the country

people have carted them to Limerick for shipment to Liverpool and London to be ground for manure.

But before proceeding with my account, it may be as well to give a description of the locality in which this extraordinary deposit of bones was found. About ten miles from Limerick, and two from Bruff, on the mail-coach road to Cork, is a small lake called Lough Gûr, a long, narrow, winding sheet of water, and having in the middle an island, which, in my opinion, must have been used as a cooking kitchen or slaughtering place for an army, for the skulls and bones of the animals above-mentioned were found in the water all round the island, so that one would think the cattle of an entire nation must have been slaughtered to produce so vast an assemblage: and I should add in this place, that the Count de Salis, the lord of the soil, informs me that he has in his possession many swords, spear-heads, and a brass dish also found on the island.

The lake is surrounded by castellated mountain limestone of a whitish colour, which being bare of vegetation, has, at a distance, something the appearance of a ruined city, and must have been originally very difficult of access. Some time ago Count de Salis sunk a canal in connection with the lake; this had the effect of lowering the water many feet, and of greatly reducing the size of the lake, both in length and breadth: it was thus that the bones around the island were rendered visible to the Count's tenants, who carted them in vast quantities to Limerick, as I have already mentioned, and at the present time none can be obtained without dredging. By this lowering of the water of the lake, a fine hard black turf was exposed, and this has afforded excellent fuel to the tenantry in the neighbourhood.

I will now endeavour to describe the skulls of the different animals, as well as I am able in the absence of collections in our public institutions to which I can refer: and will begin with those of the giant deer, which have stamped on their frontal bones the obvious evidence of man's destructive hands. These heads agree in every particular with those of the male except in the want of horns, the puffed out lower portion of the face and the base of the skull near the occiput: every inequality on the skull caused by the presence of veins or arteries, or by the attachment of muscles is precisely the same in male and female. The *second* species is a much smaller deer, and the skull differs from that of the giant deer, in being more elongate and narrower, and in wanting the puffed appearance of the face: the base of the skull and occiput also differ. The *third* species is the red deer,

or crowned stag. The *fourth* species has eight or nine sharp and very long tynes, but not crowned. The *fifth* is the fallow deer, varying very remarkably in size. The skulls of cows or oxen were of five kinds. *First*, with a very broad square face quite flat and almost smooth, and much larger than that of any ox of the present day : one of our professors here considers this the skull of the Urus, but I think that animal has never reached Ireland, and therefore, in the absence of the necessary means of comparison, we must distinguish it by the name of the "flat-faced ox." The *second* in size is large and strong and has the face concave, and the skull crowned by a projection between the horns : the slugs on the bony elongations of the skull are long and spreading. The *third* has the skull very smooth and very different in texture from the two already described ; it is also deeper from the under jaw to the face than either of the others : the frontal bone is very long, and is rounded at the sides : this animal must have had a remarkably long face. I must observe that the skulls of all these three are much longer than those of any oxen we now possess ; and I may observe, the bony peduncles of the horns are not in any instance directed backwards as in the buffalo, but invariably take the same direction as in our recent oxen. The *fourth* is a long-faced kind, with small thin horns, curling inwards. The *fifth* is what might be called the short-horned breed, and appears identical with that which we are now importing from England ; but these skulls furnish sufficient proof that this breed was originally Irish. The skulls of goats resemble those of the common species, except that the horns have a greater inclination backwards like those of antelopes. The skulls of hogs or pigs are very different from those of our domesticated swine : one skull in particular has a snout or face more like that of an alligator, being very long, and the space between the teeth on the palate of the mouth not exceeding an inch and a half,* although the bone from the angle of the eye to the extremity of the nose, is nine inches in length. It is worthy of remark, that all the tusks we met with were nearly of the same size, so that it would appear that the pigs were all brought to be slaughtered at nearly the same age.

Now, I consider the discovery of the fractured skulls of the giant deer, under the circumstances above described, to be the most con-

* I may perhaps be allowed to state that this character does not exhibit any similarity to that of the alligator, although immediately following the comparison, it seems thus intended.—ED.

vincing proof ever laid before the British public, that this splendid animal was domesticated by man for his use and food, and was driven by him in company with herds of other cattle to a common slaughter-house, otherwise how came these skulls mixed up with those of other cattle, evidently brought together to be slaughtered in the way now adopted.

On showing the handles of knives made of the horns of the fallow-deer, several gouge and chisel-shaped instruments, and also broken earthen vessels, to Captain Croker of Ballinagar, he told us that he had seen spear-heads, swords, and other instruments, found in the ruins of forts and castles near his residence; and Captain Roberts of Sallymount, in the county Kildare, informed us that he has in his estate several of those mounds which, in this country, are called Danish forts or raths; and that last summer, when removing the earth from one of these which is larger than the rest, and has a covered way to it, he found many bones and skulls of the giant deer, together with broken horns of the same animal, and the skull of a man, with a hole in it something resembling holes made by a musket-ball.* Near Captain Robert's residence are many holes, like small sand-pits or quarries, and into these, the bones and horns of the giant deer had been promiscuously thrown: I have seen specimens taken out of these holes, within two hundred yards of the Captain's residence. I will also add, that Major Thomas Walker, of the county Wexford, a gentleman of first-rate talent, and an indefatigable naturalist, has obligingly handed me the following memorandum. "A portion of the leg of the Irish giant deer, dug up in his own estate, is in the possession of H. Grogan Morgan, Esq., of Johnstown Castle, county Wexford, with a portion of the tendon, and skin with hair upon it: it was exhibited some time ago by Mr. Peel at his veterinary lectures in Dublin."—*Thos. Walker.*

In Pepper's History of Ireland, in which the battle-grounds of the contending kings and warlike chieftains, together with the number of cattle taken by one marauder from another, are faithfully chronicled; Lough Gûr is particularly noticed.

In a country like Ireland, cut up as it then was by internal warfare, and by the frequent visits of the Danes, it does not seem wonderful that so large and ponderous an animal as the giant deer should entirely disappear and become extinct. From its large bulk it could not elude the marauder or the hunter.

* This similarity must be accidental.—Ed.

I may add that the water of Lough Gûr is supplied by rain or land springs, and that there is no stream passing through it: also that we found several of the heads of this magnificent deer lying on the bare rock and only covered by the clear waters of the lake: several common species of freshwater snails were attached to the skulls and horns.

As it is concluded to dredge the lake when the weather is favorable, I have determined to give you further information should anything worthy of recording in your excellent journal result from our labours.

RICHARD GLENNON.

3, Suffolk Street, Dublin,
Nov. 16th, 1846.

*Discovery of the Bones of Deer and Cattle in Lough Gûr.**

THE connection of science, more particularly, geological science, with the theory and practice of agriculture, is now too generally admitted and appreciated, to render it necessary for us to apologise for bringing the following facts under the notice of our readers; facts, also, we may add, which possess still stronger claims upon our attention, inasmuch as they involve questions relative to the origin and history of several of our most esteemed breeds of cattle, as well as to the date at which the *sheep* was first introduced into this island. These are, be it remembered, not mere matters of speculation. The facts we are able to lay before you are clear and decisive, so much so that correct inductions necessarily follow.

At the time when the last cattle show was held at Limerick, two of our fellow-citizens, Messrs. Nolan, of Bachelor's-walk, and Glennon, of Suffolk-street, proceeded thither, for the purpose of becoming exhibitors; the former of his magnificent collection of foreign poultry, and the latter of his beautiful cases of stuffed birds. Of their success we need not now speak, as we, at the time, had the pleasure of recording their signal triumph in the pages of the Gazette.

Near Limerick there is a moderate sized lake, called Lough Gûr, having an island in the middle. Our travellers having received infor-

* We extract this from the 'Farmer's Gazette': it is written by another eyewitness, and is therefore interesting.

mation, that in this lake had been found many fossil remains, and, as we need scarcely remark, this being their favourite pursuit, proceeded, after the termination of the show, to inspect the spot. We may also observe that we had the pleasure of accompanying them.

We exhumed various skulls and bones, among which we may mention those of oxen, pigs, goats, the red deer, and the extinct Irish gigantic deer; and, we believe, for the first time in Ireland, the reindeer, &c., but found none of *sheep*—a singular fact, and going, we are of opinion, far towards furnishing an inference, that, at the period when those deposits were formed, the sheep had not as yet become one of our domestic animals. The quantity of the remains of *goats* deserves attention, the name of the lake “Lough Gûr” (or Gour), signifying, in Irish, “Lake of the *Goats*.”

Among the heads of oxen, some were chiefly remarkable on account of their prodigious size, others on account of their singularity of formation, but that which more immediately interested us was, that we found several skulls of a *short-horned breed of cattle*, similar, in size and form, to those animals which are now so highly prized among us, on account of their superiority over other varieties, but which we are compelled to resort to England in order to obtain.

Here, then, in this vast depository of bones, we discover sufficient evidence to prove that we, in olden time, possessed the true short-horned variety of cattle, if we can judge by the skeleton heads, which we are now compelled to import from the sister country; and we are almost authorized to infer, that it was to Ireland that England herself was originally indebted for the stock from which the “pure” short-horns are descended. Most of these skulls were fractured on the frontal bone, evidently with some blunt instrument, showing that they had been felled and slaughtered for human use, and also that, in the days of old, butchers followed pretty much the same mode of slaughtering that they do now. The discovery of these remains demonstrates another and a particularly interesting fact, *viz.*, that the Irish giant deer, sometimes improperly termed the Irish *elk*, was co-existent with these short-horned cattle, was itself a domesticated animal, and was itself killed for human use; for we have to add the extraordinary fact that, amongst other fragments, we found the remains of several giant deer, and, amongst others, two female skulls fractured on the frontals in precisely the same manner as those of the cattle. We have the more pleasure in mentioning this fact from the circumstance that it confirms, in the most unanswerable manner, the posi-

tions advanced in Mr. Richardson's clever pamphlet* on the fossil deer—positions in which Mr. Richardson stood alone at the time of their publication, and had to endure the opposition of some of the most celebrated savans of the day. Amongst others we may mention Professor Owen,† of London, who maintained that not only was the giant deer not contemporary with man, but that he was created some thousands of years prior to the existence of man upon the surface of this globe. Mr. Richardson published his pamphlet in reply to the views advocated by Professor Owen, and whatever doubt might then have existed, as to which side the truth lay upon, we think that this remarkable discovery is amply sufficient to establish the correctness of Mr. Richardson's views, and to set this disputed question at rest *perhaps* for ever. We confess that we rejoice at this, for Mr. Richardson is not only our fellow-countryman and personal friend, but an esteemed contributor to our pages, on topics connected with the zoology of the farm. While upon this subject, we think it not irrelevant to adduce one or two facts that have been communicated to, or have fallen under our own observation, and still further confirmatory of the correctness of Mr. Richardson's views. One of the most extraordinary of these facts is, that some years ago, a portion of the leg of an Irish giant deer, with a part of the *tendons*, *skin*, and *hair* upon it, was exhumed, with other remains, from a deposit on the estate of H. Grogan Morgan, Esq., of Johnstown Castle, county Wexford, and is now in that gentleman's possession. This leg was lectured upon at the time by Mr. Peile, veterinary surgeon, in Dublin. This is a most important fact, and we wonder that it has escaped Mr. Richardson's attention, for he has not noticed it in his pamphlet.

We regret to have to add that the above singular and most interesting fragments have been suffered to leave this country—their legitimate and proper position—Mr. Nolan having just left Ireland with them for London, their destination being the British Museum.

* Facts concerning the Irish Giant Deer, by H. D. Richardson. Dublin: M'Glashan, 1846.

† On the British Fossil Mammalia. London: Van Voorst, 1846.

Notice of 'Short Sketches of the Wild Sports and Natural History of the Highlands. From the Journals of Charles St. John, Esq.'
London : Murray, Albemarle Street. 1846.

MUCH after the manner of White's Selbourne, but written in a very different locality, Mr. St. John's work is one of the best we have met with, and therefore it is a very pleasing duty to introduce it in this notice to the readers of the 'Zoologist,' as one by which they must be interested and instructed. Although evidently a keen sportsman, yet the author has a keen eye for Nature. He has observed her in the plains of Wiltshire, and in the loftiest peaks and deepest glens that the Grampians of Scotland present. He has observed correctly, and recorded graphically. This volume causes only one subject of regret: it makes one reflect how many valuable facts, what a vast amount of information, might have been collected by those—and they are many—who have had as good or better opportunities than even Mr. St. John. How much have we thus lost, and are daily losing! Were one-tenth of the gentlemen who annually flock to the Highlands of Scotland, as the twelfth of August approaches, imbued with but a portion of Mr. St. John's taste, the natural history of that vast mountain range would have been far better known than it now is. The Grampians would no longer have been a terra incognita. This, perhaps, is rather a harsh or hasty conclusion. There may be others who have observed and recorded as accurately and fully as Mr. St. John, but whose manuscripts have not yet been laid before the public. If so, we hope his example will be followed by all who have collected, or who have an opportunity of making observations illustrative of the habits of the animals that are found in the "Highlands." No doubt many a sportsman could detail facts coming within his own experience, but the number of which prevents his adventuring upon a volume. For such, the pages of the 'Zoologist' supply the fittest medium for their being brought to the light; and it is to be hoped that a rich harvest of this nature is in store for it. It is the first three classes of the animal kingdom that Mr. St. John's work chiefly dwells on. As it is most in keeping with the plan adopted by the 'Zoologist,' selections will be made and given under these heads, to which, in the present and after numbers, the attention of its readers is directed. The opening page runs as follows, descriptive of the localities he has been in, and his turn for such studies.—"I have lived for several years in the northern counties of Scotland, and during the last four or five, in the province of Moray, a part of the country peculiarly adapted for

collecting facts in Natural History, and for becoming intimate with the habits of many of our wild birds and quadrupeds. From my earliest childhood I have been more addicted to the investigation of the habits and manners of every kind of living animal than to any more useful avocation, and have, in consequence, made myself tolerably well acquainted with the domestic economy of most of our British *feræ naturæ*, from the field-mouse and wheat-ear, which I stalked and trapped in the plains and downs of Wiltshire during my boyhood, to the red deer and eagle, whose territory I have invaded in later years on the mountains of Scotland. My present abode in Morayshire is surrounded by as great a variety of beautiful scenery as can be found in any district of Britain; and no part of the country can produce a greater variety of objects of interest, either to the naturalist or to the lover of the picturesque." Then follows an account of "the rapid and glorious Findhorn, the very perfection of a Highland river,"—the forest of Darnaway,—the bay of Kinloss, "always a great resort of water-fowl of all kinds from the swan to the teal, and also of innumerable waders of every species,"—"that most extraordinary and peculiar range of country called the Sand-hills of Moray, formed of the purest sand, with scarcely any herbage, excepting here and there patches of bent or broom, which are inhabited by hares, rabbits, and foxes,"—"the fertile plains of Moray,"—"the wide extending woods of Altyre, abounding with roe and game,"—and "the extensive range of the most excellent grouse-shooting country which reaches as far as the Spey. On the whole, I do not know so varied or interesting a district in Britain, or one so well adapted to the amusement and instruction of a naturalist or sportsman. In the space of a morning's walk, you may either be in the most fertile, or in the most barren spot of the country. In my own garden every kind of wall-fruit ripens to perfection, and yet at the distance of only two hours' walk you may be either in the midst of heather and grouse, or in the sandy deserts beyond the bay, where one wonders how even the rabbits can find their living."

Mr. St. John lives in a Scottish Walton-hall. He has delight in collecting round him "all living animals, and watching their habits and instincts; my abode is in short a miniature menagerie. My dogs learn to respect the persons of domesticated wild animals of all kinds, and my pointers live in amity with tame partridges and pheasants, and my terriers and beagles strike up friendship with the animals of different kinds whose capture they have assisted in, and with whose relatives they are ready to wage war to the death."

The following extracts relating to birds will we feel confident be read with pleasure.

Black-cock.—"In some places, apparently well adapted for these birds, they will never increase, although left undisturbed and protected, some cause or other preventing their breeding. Where they take well to a place they increase very rapidly.

Wood-pigeons.—"An agricultural friend of mine near this place, who had yielded with a tolerably good grace to my arguments in favour of the rook, pointed out to me the other day (March 6th) an immense flock of wood-pigeons busily at work on a field of young clover, which had been under barley the last season. 'There,' he said, 'you constantly say that every bird does more good than harm; what good are those birds doing to my young clover?' On this, in furtherance of my favourite axiom that *every animal is of some service to us*, I determined to shoot some of the wood-pigeons, that I might see what they were actually feeding on, for I did not at all fall into my friend's idea that they were grazing on his clover. By watching their flight from the field to the woods, and sending a man round to drive them off the clover, I managed to kill eight of the birds as they flew over my head. I took them to his house, and we opened their crops to see what they contained. Every pigeon's crop was as full as it could possibly be of the seeds of two of the worst weeds in the country, the wild mustard and the ragweed, which they had found remaining on the surface of the ground, these plants ripening and dropping their seeds before the corn is cut. Now no amount of human labour and search could have collected, on the same ground, at that time of the year, as much of these seeds as was consumed by each of these five or six hundred wood-pigeons daily, for two or three weeks together."—p. 118.

Turtle-dove, &c.—"Though the turtle-dove never breeds here (Province of Moray), and is supposed never to visit this part of the country, I have twice seen a pair about my house, both times towards the end of autumn. Last year a pair remained for about three weeks here, from the middle of October to the beginning of November, when they disappeared; probably returning southwards, not being nearly so hardy a bird as the wood-pigeon. Besides the wood-pigeon, we have considerable numbers of the little blue rock-pigeon, breeding along the caves and rocks of the coast, and feeding inland in large flocks. On the opposite coast of Rosshire and Cromarty, very great numbers are found during the whole year."—p. 121.

Half-bred Wild Ducks.—"Some few years back I brought home

three young wild ducks ; two of them turned out to be drakes. I sent away my tame drakes, and, in consequence, the next season had a large family of half-bred and whole wild ducks, as the tame and wild bred freely together. . The wild ducks which have been caught are the tamest of all ; throwing off all their natural shyness, they follow their feeder, and will eat corn out of the hand of any person with whom they are acquainted. The half-breds are sometimes pinioned, as they are inclined to fly away for the purpose of making their nests at a distance : at other times they never attempt to leave the field in front of the house.”—p. 129.

Long-tailed Duck (Anas glacialis).—“ There is a very pretty and elegant little duck, which is common on our coast—the long-tailed duck (*Anas glacialis*). Its movements and actions are peculiarly graceful and amusing, while its musical cry is quite unlike that of any other bird, unless a slight resemblance to the trumpeting of the wild swan may be traced in it. Lying concealed on the shore, I have often watched these birds as they swim along in small companies within twenty yards of me ; the drake, with his gay plumage, playing quaint antics around the more sad-coloured female—sometimes jerking himself half out of the water, at other times diving under her, and coming up on the other side. Sometimes, by a common impulse, they all set off swimming in a circle after each other with great rapidity, and uttering their curious cry, which is peculiarly wild and pleasing. While feeding these birds dive constantly, remaining under water for a considerable time. Turning up their tails, they dip under with a curious kind of motion, one after the other, till the whole flock is under water. They are not nearly so wild or shy as many other kinds of wild-fowl, and are easily shot, though if only winged it is almost impossible to catch them, even with the best retriever, so quickly do they dive. They swim in with the flowing tide, frequently following the course of the water to some little distance from the mouth of the river. When I see them in the heavy surf on the main shore, they seem quite at their ease, floating high in the water, and diving into the midst of the wildest waves. When put up they seldom fly far, keeping low, and suddenly dropping into the water again, where they seem more at their ease than in the air. When I have shot one of these birds, its mate (whether the duck or the drake is the survivor) returns frequently to the spot, flying round and round, and uttering a plaintive call.”—p. 130.

“ *The Golden-eye (Anas clangula)*, and the morillon, are common about the river and burns. I have often heard it argued that these

two birds are merely the same species in different degrees of maturity; but I do not consider that there is the least doubt as to their being quite distinct. I have frequently shot what I suppose to be the young golden-eye not arrived at its full plumage; but in these the white spot at the corner of the mouth is more or less visible. The birds are larger than the morillon, besides which the golden-eye, in whatever stage of maturity it is found, always makes that peculiar noise with its wings, when flying, which is not heard in the flight of the morillon, or of any other kind of duck. I remember, too, once watching a pair of morillons in a Highland loch, late in the spring: they had evidently paired, and were come to the age of maturity, and ready for breeding.

"The golden-eye dives well, remaining a considerable time under water seeking its food, which consists of small shell-fish which it finds at the bottom. The morillon frequents the same places as the golden eye, but always remains singly or in pairs, whereas the latter birds frequently unite in small flocks, particularly when they take to the inland lochs, which they do at the commencement of the spring."—p. 131.

Wild Geese.—"The first wild geese that we see here (Morayshire) are not the common gray goose, but the white-fronted, or laughing goose, (*Anas albifrons*), called by Buffon *l'Oye rieuse*. This bird has a peculiarly harsh and wild cry, whence its name. It differs in another respect also from the common gray goose, in preferring clover and green wheat to corn for its food. Indeed, this bird appears to me to be wholly graminivorous. Unlike the gray goose too, it roosts, when undisturbed in any grass-field where it may have been feeding in the afternoon instead of taking to the bay every night for its sleeping quarters. The laughing goose also never appears here in large flocks, but in small companies of from eight or nine to twenty birds.

"Though very watchful at all times, they are more easily approached than the gray goose, and often feed on ground that admits of stalking them. I see them occasionally feeding in small swamps and patches of grass surrounded by high banks, furze, or trees. The gray goose appears to select the most open and extensive fields in the country to feed in, always avoiding any bank or hedge that may conceal a foe."—p. 151.

We shall probably at an early date return to Mr. St. John's amusing and instructive work.

Notice of ornithological occurrences in Norfolk, for December, 1846.—A specimen of the nuthatch, perfectly white, was killed at Lyng, near Reepham, early in this month. Several instances have come to our knowledge of the occurrence of the quail in various parts of the county. Amongst them we may refer to examples taken at Reedham, on the 11th inst.; at Bawburgh, on the 14th; near Loddon, (male and female) on the 19th; and near Norwich, on the 23rd. The Norfolk plover, we are informed, was also taken about the 15th inst. at Ludham. The occurrence of these species, especially of the last, is unusual at this season of the year. A moorhen, exhibiting a singular monstrosity in each foot, was killed near Pulham, about the 26th inst. Each of the hind toes of this bird possesses a second claw, which, on the right foot merely springs from about the middle of the true toe, but in the left, is attached to a second toe, which proceeds from the original one, about half-way from its junction with the tarsus. The supplemental toe and claws are in each case attached to the *outside* of the true hind toe. Monstrosities of this kind though comparatively common amongst domesticated animals, seldom occur in those which are in a wild state, and it may be remarked as bearing upon the present case, that (although the bird in question appears to have been wild) the moorhen is a species easily domesticated, and which requires little encouragement to induce it to approach the habitations of man. More than one specimen of the little grebe was taken about the 14th inst. in the streets of Norwich, and on the 23rd, a gentleman who was passing about 11 o'clock at night along the street, was surprised by a bird of this species suddenly striking against the wall near a gas-lamp which was above him, and immediately afterwards falling upon his head. The bird was picked up, but died on the following day. The lamp to which it appeared to have directed its course, is fixed to a wall facing the south-east, from which quarter a sharp gale was blowing at the time. That uncertain visitor, the little auk, has also been taken in numerous instances; at Sculthorpe on the 3rd inst.; at Norwich on the 5th; at Horsey on the 7th; at Cromer and Stratton Strawless on the 17th; and at Salthouse and Fakenham on the 18th and 19th; with several others. It may be observed, that several of these places are at some distance from the sea; and it is curious that all the specimens which we have had an opportunity of examining, are at this early period assuming the mottled appearance on the throat, which indicates the approach of the black plumage of the breeding season. We are also informed, that the Iceland gull in adult plumage, was taken about the 19th of the month.—*J. H. Gurney; William R. Fisher; 31st December, 1846.*

Some account of a Tame Partridge.—The following account of a very extraordinary pet, a tame partridge, will be interesting to readers of the 'Zoologist.' I was not myself acquainted with the bird, but heard of it, I think during its life, from very intimate friends of its mistress, whose brief notice below, of its habits and peculiarities, mentions, I have reason to believe, but a portion only of those amusing traits by which it was distinguished.—“On the 5th July, 1839, I received a small hamper, containing a parcel of cotton wool, in the midst of which was a young partridge, about a day old. The little wild thing could not be induced to eat, so I was obliged to feed it with boiled rice. I never expected to bring it up, having always heard that to handle a partridge was a sure way to destroy it; but there is no rule without an exception, and this little creature was hardly ever out of my hands. It soon became quite tame, and whenever I put my hands together before it, it would creep in, and go to sleep very well contented. Warmth being indispensable, I used to pin it up in fleecy-hosiery for the night, and in the morning fed it quite early, leaving it to sleep again. Rice,

bread, and ants' eggs were its food, upon which it thrived. It soon showed it liked to be always with me, and was perfectly happy in my lap; or when I have been painting, it would sit on my left arm, dressing itself, or sleeping in entire security. When it outgrew the flannel and I could no longer leave it pinned up, I used to take it into my mother's room, and if it could lie on her gown at her feet, it was contented, but was always on the watch for my coming back, and on seeing me, would jump up, and run to meet me. It was now so tame and pleased with being fondled, as to excite much astonishment. My mother soon became very fond of it, and by degrees it was more with her than with me. Its cage was never inhabited; it would never sleep in confinement, therefore was awake, and quite alive all the evening, being either in lap or on the sofa. When he had changed his feathers, and attained his full plumage, he refused to be handled, but his habits were just as sociable as before. His knowledge of every one was most extraordinary; his likings, and dislikings were very strong; and he was so curious and observant, that no piece of furniture could be moved without his finding it out, and if the carpet was not smooth, he would set to work instantly to render it so, by scratching and pecking. He was very fond of gay colours, and no new gown or cap could be put on without catching his attention. He never offered to go up stairs or down, and very rarely used his wings. On being gently chastised when he did fly, he would run and hide himself like a child, as if he knew he had done wrong. A box of earth was given him to rub in, which he thoroughly enjoyed. His feathers were always glossy, and in the most perfect order, which I attribute to his always having plenty of green food, such as grass and clover cut small. In the winter he liked wheat, but rarely touched it in the summer; was very fond of sugar and cake; drank very little water, and liked his food dry. He never forgot any one he had made acquaintance with, and the return of any of the family after many months absence, caused him so much joy and excitement, that I have been compelled to shut him up. He would distinguish the voices, even before they got out of the carriage. His partiality for my mother was very great, and if she was asleep, nothing would tempt him to quit her; but he never liked her to be in the drawing room. In the evening he always came into the drawing room, and remained till we retired. He slept at my bed-side, and never disturbed me, nor got up himself, till I was called; and then he had a particular call if he fancied I was gone to sleep again. Once from being frightened, he flew out of the window, and being recovered after much trouble, (it was in a town) he never again offered to get out. After this we had nets at the window, and the net being one day left down in my room, by running up to my mother and then into my room, he attracted her notice, and she followed him, he standing before the window, and when the net was replaced, showing himself satisfied. Unlike most pets, he died a natural death on the 1st January, 1843."—*Arthur Hussey, Rottingdean, November, 1846.*

On Reptiles, &c., near Bonn.—One beautiful day last July, we took a drive to the alum-works of Friesdorf; as we ascended the hill, a melodious croaking was heard on every side; the coachman said it was wood-pigeons, but we made up our minds it must be tree frogs; we searched for them in vain, wherever we went the noise seemed to surround us, but never very close; it excited pleasing ideas of enchanted groves. I am not familiar with the cooing of the stock-dove, but these voices *seemed* too small, too numerous, and too close at hand for that. We collected specimens of the buried forest

in every stage, from perfect wood to perfect coal, but were disappointed in not meeting with any of the strata in which were found the fossil frogs. I was much surprised however, to find so goodly a collection of living batrachians in the pools about—chiefly small specimens, as though they were bred there—first, I recognised the natter-jack in plenty; then I caught a kind of toad, which in its brilliant orange mottled belly, reminded me of the warty newt, it also resembled it in its strong pungent smell when handled; it was blacker than the common toad on the back, and had larger feet, which, the hind as well as the fore, it almost inverted over its back, in resigning itself to its fate, and to a much greater degree than the common toad does, which only puts its fore-paws over its head like a school-boy who is getting thrashed. There was also another species of toad, chiefly differing at first sight from our common toad in the colour of the eyes, which were grayish, instead of bright gold-colour. I did not recognize there, our common toad. I was previously ignorant of the fact, and it struck me as very remarkable, that there should be two species of toads, that we have not in England at so little distance from us. A day or two after the above mentioned excursion, in examining the crater of the extinct volcano, Roderberg, as I was minutely inspecting a little cavity naturally formed in a bed of cinders, I raked out a toad apparently of the same species as the last spoken of above; to my great surprise, and with very great interest, I observed a string of eggs tied round the hocks or knees of its hind legs. They were *tough* and semi-transparent, and I think I may describe their appearance by saying that the toad's hind legs looked as if they were chained together by a necklace formed of large mustard-seeds strung on fishing-gut. The time of year too! Was it a male or female? What will it do with its eggs? How different they are from the spawn of the common toad, and yet how very much alike the animals are, with such different habits! I kept it in a tin box for some days with my other toads, and unfortunately, its eggs got separated from it, though the string had appeared to be tightly twisted round each knee, or heel, if we choose so to call it, there being no communication with the body. At Coblenz, I put them in spirits of wine, thinking they would die instantly, but they were several minutes first, and one poor fellow made me deeply regret that I had inflicted such pain upon him, as he showed by opening his mouth wide, and trying to wipe it out with his fore feet. I carried this and several other bottles of reptiles about with me for several weeks, but as they leaked rather, I got tired of them, and gave them to a museum-keeper at Bern, where also I saw other specimens of the same two species of toad, bottled and named, but I did not take note of the names. Whilst on the subject of toads and frogs, I may be allowed to make the observation that like the other genera of reptiles, they seem to rejoice in heat, though it must be combined with moisture; on the hottest days in North Africa, I have seen hundreds of frogs and of several species, basking on the banks of pools; on any alarm, they jump into the water, sometimes with a very great leap. Mr. Darwin found no frogs in the damp woods of Tierra del Fuego. In England we have several fewer reptiles than our neighbours in the East, though we have two or three more than our neighbours in the West; are the sea breezes of the Atlantic unfavourable to reptile life? Yet natter-jacks live like gentlemen in houses of their own in the sand dunes near Calais. I will mention one more remarkable reptile I observed near the Rhine. It was on the banks of the crater Lake, the Laacher See. I was feeling somewhat nervous and conscious-stricken, having just subjected a puppy to a "grotto del Cano" I had been guided to by a country lad, when I suddenly came upon what at first sight seemed to be a common viper; after the first start, I seized it and threw

it into an open space where I could observe its motions ; the first thing that struck me was a peculiar vibration of the tail, as though it would claim relationship to the rattlesnake ; at the same time, it showed very little inclination to bite, and had not that curling of the upper lip which a viper shows when it is angry. I soon contrived to get it by the nape of the neck, and to examine it more closely, I found the pupils of its eyes were round, as in the common snake, not cat-like as in the viper, and it had no poison-fangs ; it had a meeker appearance than the viper, but in colouring much more resembled it than the snake. I must just add with reference to what I called the " grotto del cano " that it is situated in a thicket, and is a little depression in the soil, perhaps 6 feet across, and 3 feet deep, in the bottom of which is a hole like a mouse-hole from which issues the carbonic acid (?) gas ; I saw at the bottom a common toad in a state of putridity, upon which were settled several golden-bodied meat-flies, standing as if alive, though upon examination they proved to be dead. I held the puppy in the hole, breathing quicker and quicker, till it was to all appearance nearly dead, but it recovered almost immediately on being restored to good air. It had, I believe, accidentally followed my juvenile guide.—*J. Wolley.*

The Great Sea Serpent.

It has been the fashion for so many years to deride all records of this very celebrated monster, that it is not without hesitation I venture to quote the following paragraphs in his defence. A month only has elapsed since I had occasion to quote with approbation, a very marked passage from the pen of Sir J. W. Herschell, [Zool. 1586] : I may apply it with equal propriety to the enquiry of the era of the Irish deer, or the existence of the great Sea Serpent. Naturalists, or rather those who choose thus to designate themselves, set up an authority above that of fact and observation, the gist of their enquiries is whether such things *ought to be*, and whether such things *ought not to be* ; now fact-naturalists take a different road to knowledge, they inquire whether such things *are*, and whether such things *are not*. The 'Zoologist,' if not in itself the fountain-head of this *fact* movement, may at least claim to be the only public advocate of that movement ; and it is therefore most desirable, that it should call the attention of its readers to the following remarkable paragraphs. They are quoted from one of our daily papers, which give them as literal translations from the Norse papers, in which they originally appeared ; the localities mentioned are intimately known to all travellers in Norway ; and the witnesses are generally highly respectable, and of unimpeachable veracity. The very discrepancies in the accounts prove the entire absence of any preconceived scheme of deception. The only question therefore for the fact-naturalist to decide, is simply, whether all of the records now collected, can refer to whales, fishes, or any other marine animals with which we are at present acquainted.

" In the neighbourhood of Christiansand and Molde, in the province of Romsdal, several persons, highly respectable and credible witnesses, have reported that they have seen this animal. In general they state that it has been seen in the larger Norwegian fjords, seldom in the open sea. In the large bight of the sea at Christiansand, it has been seen every year, though only in the warmest season, in the dog-days, and then only when the weather was perfectly calm and the surface of the water unruffled. The following persons whose names are here mentioned, give the subjoined testimony:—

Nils Roe, workman at Mr. William Knudtson's, relates: I saw the serpent twice, once at noon, and two days afterwards towards the evening, in the fjord at the back of Mr. Knudtson's garden. The first time it was about a hundred feet distant. It swam first along the fjord, then afterwards direct over the spot where I stood. I observed it for above half an hour. Some strangers who were on the opposite shore fired at it, when it disappeared. The second time it was further from me. It was small, perhaps twice as long as this room (about forty-four feet); while swimming it made serpentine movements, some to the side, others up and down. I cannot state what thickness it was, but it appeared to be about as thick as a common snake in proportion to its length. It was thinner towards the tail. The head was several times slightly elevated above the surface of the water. The front of the head was rather pointed; the eyes were sharp, and glistened like those of a cat. From the back of the head a mane like that of a horse commenced, which waved backwards and forwards in the water. The colour of the animal was a blackish brown. John Johnson (merchant, about sixty years of age): I saw the animal some years since in the fjord; it was about a thousand paces distant when nearest to me. It swam very swiftly; in the same time that we rowed about a quarter of a mile to the side from it, it had swam about double the distance. I saw it most plainly when it swam in a semicircle round a tolerably large rock that obstructed its passage; in doing this it partly raised itself above the surface of the water. Its colour was blackish brown, and about the length of this house (fifty-five feet). With the exception of the head, I did not remark much of its body, as that appeared but little above the surface. Judging from what I observed, I should say the thickness of the body was about that of a stout man. The agitation it caused in the water was very strong. Its movements were serpentine, up and down, like a leech swimming. Lars Johnöen (fisherman at Smölen, about fifty years of age): I have several times seen the sea-serpent, but some time since, twelve years ago, in the dog-days, in the fjord not far from here, one afternoon as I was fishing in my boat, I saw it twice in the course of two hours, and for some time quite near me. It came close to my boat, so that it was only about six feet from me. I became alarmed, recommended my soul to God, laid down in the boat, and only held my head so far over it that I could observe the serpent. It swam now past the boat, that was agitated by the ripple caused by its movement in the water, which was previously smooth, and afterwards removed itself. After it had swam a considerable distance from me, I began again to fish. Not long afterwards, the serpent came close to the boat, which was strongly agitated by its movements in the water. I laid down and remained quite still, and notwithstanding my fright, kept a watchful eye on the animal; it passed me, disappeared, and returned, though not so close as previously, and disappeared entirely when a light wind arose, and ruffled the water. Its length was about five to six fathoms, and the body, which was as round as a serpent's, was about two feet in diameter. The tail seemed to be very round. The head was about as long as a brandy anker (ten gallon cask), and about the same thickness, it was not pointed but round. The eyes were very large, round, and sparkling. Their size was about the diameter of the box here (five inches), and they were as red as my neckerchief (crimson). Close behind the head, a mane like a horse's, commenced along the neck, and spread itself on both sides, right and left, while swimming on the water; it was of tolerably long hair. The mane as well as the head, and the rest of the body, was brown as this looking-glass frame (old mahogany). Spots, stripes of other colours I did not observe, nor were there any scales; it seemed as if the body was quite smooth. Its movements were

occasionally fast and slow, which latter was the case when it neared my boat ; I could clearly observe it ; it was serpent-like, and moved up and down. The few undulations which those parts of the body and tail that were out of the water made, were scarcely a fathom in length. These undulations were not so high that I could see between them and the water. When Lars Johnöen had given this explanation, he was shown the drawing which Pontoppidan has given of this animal. He looked at it with astonishment, smiled, and said he found a great resemblance between it and the animal he had seen. He likewise said, that some of the other sea-serpents he had seen were a great deal longer than the one above described.

Mr. William Knudtson and Candidatus Theologiæ Bochlum, gave the following written account: We together saw the sea-serpent in a narrow fjord, at a distance of about one-sixteenth of a mile (half an English mile), for about a quarter of an hour ; afterwards it dived, and came up so far from us that we could not see it plainly. The water was smooth as a mirror, and the animal had, as it moved on the surface, the appearance of a serpent. Its motions were in undulations, and so strong that white foam appeared before it, and at the side, which stretched out several fathoms. It did not appear very high above the water, and its length was quite discernible. Once it stretched its head quite erect in the air. The body was somewhat dark, and the head nearly black, it had nearly the form of an eel, or snake, and a length of about 100 feet, and in proportion to it an inconsiderable thickness. The breadth diminished remarkably from the head, so much so that the tail ended in a point. The head was long and small in proportion to the throat, as the latter appeared much greater than the former, probably as it was furnished with a mane. Foged (Sheriff) Götsche made the following remarks : I saw the sea-serpent for some time in a small fjord, first from a boat, afterwards from the beach, several minutes, at a distance of from thirty to thirty-six feet. In the beginning it swam round the fjord at Torvig, afterwards it went into the deeps. I saw its head stretched considerably out of the water. I remarked as well two or three undulations of the fore-part of the body. Its motion was not like that of an eel, but consisted in waving undulations, up and down. They were excessively strong, and caused tolerable large waves ; they were largest at the fore-part of the animal, and towards the back gradually lessened. The traces of them I discerned in a length of eight to ten fathoms, and a breadth of two to three fathoms. The head seemed blunted, and had the size and form of a ten-gallon cask, the undulations of the body were round and about the dimensions of a good timber stock (twelve to fourteen inches square). The entire length of the animal I could not judge, as it was not possible to observe the extremity. Its colour appeared to be dark gray. At the back of the head there was a mane, which was the same colour as the rest of the body.

The writer of this article received letters from Mr. Soren Knudtson, stating that a sea-serpent had been seen in the neighbourhood of Christiansand by several people, and from Dr. Hoffmann, a respectable surgeon in Molde, lying on a considerable fjord to the south of Christiansand, Rector Hammer, Mr. Kraft, curate, and several persons, very clearly saw, while on a journey, a sea-serpent of considerable size.

The Rev. Mr. Deinboll, Archdeacon of Molde, gives the following account of one which was seen last summer near Molde. The 28th of July, 1845, J. C. Lund, bookseller and printer ; G. S. Krogh, merchant ; Christian Flang, Lund's apprentice ; and John Elgenses, labourer, were out on Romsdale-fjord, fishing. The sea was, after a warm sunshiny day, quite calm. About seven o'clock in the afternoon, a little distance from shore, near the ballast place and Molde Hooe, they saw a long marine ani-

mal, which slowly moved itself forward, as it appeared to them, with the help of two fins, on the fore-part of the body nearest the head, which they judged from the boiling of the water on both sides of it. The visible part of the body appeared to be between forty and fifty feet in length, and moved in undulations like a snake. The body was round, and of a dark colour, and seemed to be several ells (an ell two feet) in thickness. As they discerned a waving motion in the water behind the animal, they concluded that part of the body was concealed under water. That it was one connected animal they saw plainly from its movement. When the animal was about one hundred yards from the boat, they noticed tolerably correctly its fore-part, which ended in a sharp snout; its colossal head raised itself above the water in the form of a semicircle; the lower part was not visible. The colour of the head was dark brown and the skin smooth. They did not notice the eyes or any mane or bristles on the throat. When the serpent came about a musket-shot near, Lund fired at it, and was certain the shots hit it in the head. After the shot he dived, but came up immediately. He raised his head in the air like a snake preparing to dart on its prey. After he had turned and got his body in a straight line, which he appeared to do with great difficulty, he darted like an arrow against the boat. They reached the shore, and the animal perceiving it had come in shallow water, dived immediately, and disappeared in the deep.

Such is the declaration of these four men, and no one has any cause to question their veracity, or imagine that they were so seized with fear, that they could not observe what took place so near them. There are not many here, or on other parts of the Norwegian coast, who longer doubt the existence of the sea-serpent. The writer of this narrative was a long time sceptical, as he had not been so fortunate as to see this monster of the deep, but after the many accounts he has read, and the relations he has received from creditable witnesses, he does not dare longer to doubt the existence of the sea-serpent.

Molde, the 29th Nov., 1845.

P. W. DEINBOLL.

The following gives some later particulars :—

Sunds Parsonage, August 31, 1846.

On Saturday, the 8th inst., in the course between the islands of Sartor Leer and Tös, a sea monster, supposed to be a sea-serpent, was seen by several persons. Early on this day just as the steamer *Biörgvin* passed through Rognefjord towing a vessel to Bergen, Daniel Solomonson, a cotter, saw a sea-monster, whose like he declares he never met with although accustomed to the sea and its inhabitants from his earliest years. The animal came swimming from Rognefjord in a westerly direction towards his dwelling at Grønnevigskjæset, in the northern part of the parish of Sund. The head appeared like a Føring boat (about twenty feet long) keel uppermost, and from behind it raised itself forward in three, and sometimes four and five undulations, each apparently about twelve feet long: its rate appeared to be that of a light boat rowed by four active men. When it reached Grønnevigskjæset at a distance of two rifle-shots it turned with considerable noise and continued its course towards Lundenes. Later about eleven o'clock in the same day his wife Ingeborg, in Daniel's absence, heard a loud noise in the sea, and she and two little children saw a great monster, such as described above, take a northerly course, close by their place at such a rate that the waves were dashed on the shore in the same way as when a steamer is passing by. Neither of them say that they saw anything like eyes or fins, or indeed anything projecting from its round form, but they declare that the colour of the animal was dark brown.

and that it often rose up with gentle undulations, sometimes, however, sinking below the surface so that merely a stripe indicated the rapid course of the gigantic body. On the same morning a lad, by name Abraham Abrahamsen Hagenæs, was out fishing in the Rognefiord, not far from Lundencæs, and just ready to throw out his line, when he, as he asserts, became aware that at about one hundred fathoms distance a monster with a head as large as a Fœring boat (about twenty feet long) and a long body lay upon the sea like large kegs and was nearing his boat: seized with a panic he exerted all his strength to reach the shore, and as the animal, apparently following him, was only about forty fathoms off, he leaped ashore, drew up the boat and ran up the bank, whence he viewed the monster which had by this time approached the shore within twenty fathoms. He says that that part of the body which was visible was about sixty feet in length, and that its undulating course was similar to the eel: that the colour of the back was blackish, shining strongly, and as far as he could distinguish there was a whitish stripe under the belly. Report also says that the sea-serpent was seen by several persons in Biornfiord causing a great deal of dread, but of this our informant wants authentic accounts. Our informant further says that he has no reason whatever to doubt the truth of the story of the man and his wife, or the trustworthiness of the lad Abraham, except as far as that his fears may have caused him to see several things through a magnifying glass.

Notes on the Fishes of the Land's End. By R. Q. COUCH, Esq.
M.R.C.S.L., &c.

(Continued from p. 1419).

Fishing Frog, Monk, Sea-devil, *Lophius piscatorius*. Common at all seasons, but is more frequently seen during the fine weather of summer and autumn, for at these periods it approaches nearer the shore than it does in winter. The habits of this fish are as remarkable as any found on our shores. It is a huge, unshapely creature, and is of a soft, gelatinous, and flaccid consistence. Its mouth is enormous, extending round its expanded front, and so far back as to be on a line with the eyes, and when expanded seems to be prolonged almost to the pectoral fins. But great as it is, it seems only proportionate to an inordinate appetite. The creature is remarkably inactive and apparently moves with difficulty. This antipathy to action is strangely contrasted with the enormity of its appetite, to satisfy which, it has recourse to stratagem in the capture of its prey. It generally frequents sandy bays in moderately deep water, and by the aid of its hand-like pectoral fins, it forms for itself a cavity in the sand in which it lies. The colour of the back is sandy, and this appearance is still further increased by the sand which has been

thrown up during the excavation falling all around and over its back. Thus hid from view, the long tendrils which arise from the back of the head are elevated, and their worm-like terminations are moved gently about, either at will or by the motion of the tide. This vermicular appearance deceives those small fish which may be passing, but no sooner do they bite, than by the aid of its large and powerful pectoral fins, the "fishing frog" starts from its hiding place and engulphs its unsuspecting prey. Another plan is sometimes pursued, if the soil be not sandy, but what is called by the fishermen "rough ground," the fishing frog lies at the bottom as if dead; and this appearance is greatly increased, by its soft and semi-decomposed appearance. In this position it lies, and the dorsal tendrils float carelessly about, and the numerous filaments which surround the lower jaw act as so many decoys for the smaller fish. If hungry, the fishermen inform me, the tendrils are no sooner touched than the victim is caught; but that at other times, they will wait till several victims are assembled, when they are all caught together. The dorsal tendrils have each a bony centre running through their whole length. The first is articulated at its base by a chain joint, the second by a triangular one. These, as well as the labial filaments, are well supplied with nerves from the same source as the muscles of the jaw; hence, there is an unity established between the sensation of one and the action of the other. But though it thus exercises a great deal of cunning in capturing its prey, yet it is by no means an intelligent fish. Whether it is that the voracity of its appetite demands a larger supply than its stratagems can command, or that it is the effect of mere stupidity, it is by no means particular as to what it seizes. I have heard it said, that one rose to the surface and attempted to swallow the red "barrel buoy" of a pilchard-seine; and one, a few years since, swallowed the white-washed cork buoy of a crab-pot, and from its being unable to sink again with it, became strangled, and was so caught. The tales told by fishermen of its voracity and stupidity, though no doubt exaggerated, are in some measure confirmed by what I have seen myself. It frequently rises to the surface of the water in the summer and autumn, and lies basking in the sun. It varies in length to about four feet; the sexes are distinguished, as in the rays, by the secondary characters.

Common Wrasse Conner, *Labrus Balanus*. Common, around the rocks near the shore among sea-weed. It feeds on small Crustacea and worms. It takes a worm-bait readily, and affords excellent sport to boys fishing from the rocks. The largest fish always remain the lords of their respective districts, and the smaller ones rarely intrude

beyond a few feet from their shelter ; but if the largest are caught, an abundance of smaller ones soon make their appearance. I have never detected the remains of fish in their stomachs, and hence it is not easy to say why small specimens should avoid the neighbourhood of the larger ones. The largest specimen I ever saw was caught off Tol-Pedn-Penwith, near the Land's End, and weighed four pounds, three ounces ; it was blind in both eyes from cataract. The fish of this genus are very liable to get blind as they grow old, but it is most frequently from opacity of the cornea. In this state they frequently wander into sandy nooks, and into such shallow water, that I have known them taken by the hand, and sometimes they are left dry by the ebbing of the tide.

Green-streaked Wrasse, *L. lineatus*. Of this rare species, I have seen a single specimen, which was taken off Mousehole Island, in Mount's Bay. It is quite distinct from the last, in not having the marbled appearance of the face, in having thinner lips, and the second dorsal fin smaller : it is also a more slender fish from the dorsal fin to the head, and also about the tail. The colouring is not so bright, and is more of a bluish or greenish colour than the last, and is not so interrupted.

Cook Conner, *L. variegatus*. Everywhere common. The colour, especially the blue, varies from a deep, to a very light tint. This species keeps in deeper water than the common wrasse, and prefers a rough, stony ground, with low overhanging rocks. It feeds on crustaceans, and takes a bait freely. This varies its resorts, more perhaps than any of its kindred species. In summer it approaches nearer the shore than during the winter months.

Coomber, *Labrus comber*. This is certainly the most elegantly shaped of all the wrasses found in our seas. It is the most slender, and the most graceful. The head is smaller, lips thinner, and the jaws more prolonged and pointed than any of the others. I have seen only a single specimen, caught off St. Michael's Mount, but I am informed by the fishermen that several are caught every summer.

Red Conner, Three-spotted Wrasse, *L. carneus*. This is the most brilliant of its class. Like all the wrasses, it frequents rocks at short distances from the shore. It feeds on worms and Crustacea, and takes a bait readily : it deposits its spawn generally in April, but I have found some specimens with ova in July and August. It does not appear, however, that the same specimen breeds twice in the same season, since the April and August breeders are rarely found in the same locality. Each species of this genus, though they are all

rock fish, has a particular or specific habit. I once told a boy I wished to get a red conner, and he took me to a spot where we could take but little else, in the course of half an hour we caught twenty-two, and might have taken more, if we had remained longer. They prefer from ten to twenty fathoms of water, with a rough ground or rocks standing out of a sandy soil.

Rainbow Wrasse, *Iulis Iulis*. Rare. The late Mr. E. Chergwin told me that one had been caught in Mount's Bay.

Corkwing Corker, *Crenilabrus Cornubicus*. This is one of the most abundant of the wrasses, as well as one of the smallest. It frequents the windings of rocks close to the shore, among sea-weed. They are not gregarious, for though a great number will frequent one spot, yet each seems to move about independent of the others. It takes a bait readily, and affords excellent sport to the boys fishing from the rocks. They will follow a bait to the water's edge, and I have known them so abundant that they have been taken as fast as the boys could prepare the line for them. They breed in April and May, and in June, July and August, the young, of a bright green colour, may be taken in pools with a shrimp-net, from a quarter of an inch to two inches in length. In the young state they are more slender than in the adult. As age increases they grow deeper, and the black spot anterior to the caudal fin disappears. I have not Mr. Yarrell's second edition of his 'British Fishes' to which I can refer, but in the first he says, "this fish rarely takes a bait," an observation which ought to be transferred to another species, *C. tinca*.

Goldsinny, *C. tinca*. Frequently taken in the pilchard-seine.

Iago's Goldsinny, *C. rupestris*. Not uncommon in various parts of the bay. It may be always distinguished from the corkwing by the position of the black spot on the tail, which is on the upper edge when the body joins the fin. As the fish grows the spot becomes paler and smaller, but is never, I believe, obliterated.

Corkling, *C. multidentatus*. Not very rare, about Lamorna, near the Land's End.

Rock Cook, *C. microstoma*. Common, in deep water, but as it never takes a bait, it is rarely seen. It frequents rough and stony ground, where it feeds on minute Crustacea and dead animal matter. It is most frequently caught in the crab-pots, and several are taken every morning by the men engaged in the crab fishery. It gets into the pots after the baits, which it lays hold of by its very small mouth, and tears it away bit by bit, or sucks it off till satiated.

Scale-rayed Wrasse, *C. Luscus*. Rare. Caught near Mousehole

Island. The whole of the wrasses are eaten by the fishermen, but more for the sake of variety than from any delicacy of their flavour. The flesh is very soft and rather sweet, and cannot be preserved for any length of time. The *motor lentis* or square muscle of the lens, in the interior of the eye, is strongly developed in all the wrasses, and the nervous supply is large.

Trumpet Fish, Woodcock Fish, and Bellows Fish, *Centriscus scolopax*. This is very rare. Mr. Chergwin told me that he has seen a specimen taken in Mount's Bay, and a fisherman tells me that he has taken another off Cape Cornwall.

Tench, *Tinca vulgaris*. To be found in the ponds at Trengwainton, where they were placed by the late Sir Rose Price, Bart. The dace is found in the Tamar, the carp and loach are found in a naturalized state in a few ponds, and the minnow occurs in some rivers of the county, but not within the district embraced by these observations.

Garfish, Garrick. *Belone vulgaris*. This remarkable fish is common on all parts of our shores. From the colour of its bones, it is frequently called "green bones," but its most common name among the fishermen is *Garrick*. It is migratory and gregarious in its habits, frequently approaching the shores in large "schulls." During the winter and spring it retires into deep water in a south-westerly direction, though it may be caught during every month in the year, near the shore. On the northern part of our shores about Cape Cornwall, and the other headlands, it retires in a north-westerly direction into deep water, but the largest shoals are to the west, where they remain during the winter, migrating a little up the various channels. As summer approaches they again go west, and about April, May, and June they approach the shores, and in June, July, and August, and even so late as December they are taken by hundreds in the drift-nets used for the taking of pilchards, and are sold at a very low price in the market at Penzance. Like all gregarious fish while migrating, they are fond of rising to the surface out of mere pleasure; and as they do this in the mackerel season, they are often mistaken by the seiners and enclosed for mackerel. Their motion through the water is rapid, and they will frequently rise to the surface and spring into the air, and over anything that may be floating on the surface. It freely takes the hook, but like the mackerel, and unlike most other fish, it never plays round a bait, but strikes it as if it were living. The mackerel strikes it sideways, the garfish generally obliquely upwards, hence it happens, that when it takes the hook, the first notice of the

capture is the fish starting into the air with the line, and then beating itself about on the surface to get rid of the hook, and in doing this it always emits a very strong and peculiar smell. When the fish has been common, as it was last year in Mount's Bay, I frequently fished for it with a float-line, but in no instance was the float pulled under before the fish had risen to the surface. Its digestion is very rapid; I have seen it pass through a shoal of small launce and devour them, and yet when caught, very little else than mucous has been found in the stomach; but in the effort to escape, it invariably voids whatever it has taken, even if only a few minutes before. It also feeds on small Crustacea, but its appetite is voracious and constant, and but few small things with life come amiss. It breeds about May, when it first approaches the shore. In the autumn it again retires into deeper water till the following year. It varies in length to twenty-nine inches.

Skipper, Mackerel Garrick. *Scomberesox saurus*. The Cornish name of *mackerel garrick*, shows the same discrimination as the generic name of *Scomberesox*, and is descriptive of the finlets anterior to the caudal fin. This is a very much smaller species than the last, more migratory, and its migrations extend over a greater extent of water. It is frequently caught by thousands in the drift-nets, when they are used about June and July, at a few leagues from the shore. They are exceedingly rapid in their speed, and frequently start by scores into the air, especially if pursued by any other fish. During the summer, when our beautiful bay seems teeming with fish of every kind, the scene, especially in the evenings, is frequently enlivened by a piscatory hunt,—a shoal of skippers will start into the air, and immediately after, up springs a huge bonito after them, all going at the rate of eight or ten miles an hour. In a few seconds they again fall into the water, and again renew their attempts to escape, till, apparently tired, they cannot mount above the surface, when they become an easy prey to the tunny and bonito and their other persecutors. I have seen eight thousand enclosed in one pilchard seine. In the summer time it is a high swimmer, but during the autumn it leaves for the west and south-west to go into deep water, and the autumnal mackerel fishermen tell me they see them in September, about eight and ten leagues to the south-west of the Cornish shores. They migrate towards the shores in June and July, but their movements are rapid, and they rarely remain in one spot long, hence it is difficult accurately to watch all their movements.

Flying Fish, *Exocætus exiliens*. The late Mr. Chergwin told me that he had seen several flying-fish in Mount's Bay, and on inquiry of the fishermen, I found their occurrence was not rare. It was some time, however, before I could get an opportunity of seeing any. In the summer of 1845, while about six miles off the shore, I saw many start from the water very high into the air. As they were to the west of our boat, and their course was eastward, I expected I should again have another opportunity of seeing them, and in a very few minutes I was gratified by seeing them close to us. They were pursued by several huge striped bonitos. The enormous pectoral fins, with the large ventral ones, clearly indicated the species to be the *exiliens* and not the *volitans*. They rose from the water like an arrow to about ten or twelve feet, and then gradually and glidingly fell into the water again. Their flight was different from what I expected, all the velocity seemed acquired in the water, and gradually decreased as soon as they left it. It was evidently a continuation of the flight through the water, the creature possessed no power over its motions while in the air; the large pectorals seemed to facilitate their progress upwards and to prevent their sudden dropping downwards, and to serve no other purpose, at least out of the water. The whole flight seemed like an arrow, and the pectoral fins served as the feathers. I have examined the heads of two specimens, taken near Cape Cornwall, both of which are referrible to this species.

Salmon, *Salmo salar*. As there are no large rivers in the district of the Land's End, all the fresh-water fish are rare and small. The salmon visit Mount's Bay, and all the district from Helford river to the Land's End and St. Ives Bay during their annual migrations, but they very rarely ascend the rivers.

The Peal, *Salmo trutta*. Is occasionally seen I am told, but I have never yet had an opportunity of examining a specimen.

Common Trout, *Salmo fario*. Common in the small streams of the district, the waters of which are not impregnated with copper or tin.

The Palmer Trout is entirely absent.

R. Q. COUCH.

Penzance.

On the Occasional Abundance and Rarity of certain British Insects.

By J. F. STEPHENS, Esq., F.L.S.

DR. BECKER, when in London, remarked to me one day,—“You English are a peculiar, a very peculiar people, you are surrounded by water, and like to keep yourselves to yourselves”: a remark, elicited from him, by my refusing to accept of a fine pair or two of *Catocala Fraxini*, in addition to other presents of *Lepidoptera*, I selected from his boxes; he having observed, a few days previously, that I possessed only an indifferent pair of that conspicuous insect, and being at a loss to comprehend why I should prefer bad to good specimens. To him, *C. Fraxini* was *C. Fraxini*, whether it was European or exotic. He followed up his remark by observing that he had been informed a sovereign or more, had been given for *Argynnis Lathonia* in moderate condition, whereas splendid specimens which he had brought over were refused to be purchased at a price under 1s. per pair! I explained to him it was merely because they were not British! Such is undoubtedly the fact, and it originates from various causes; the principal of which are,—a patriotic desire to ascertain correctly, the production of this, our favoured island: a wish to collect such productions only; and a disinclination to venture upon the vast and exhaustless field of foreign Entomology, and its consequent overwhelming extent. The first of these points as regards Entomology (especially), I have endeavoured with somewhat more than usual assiduity to accomplish, and have neglected no opportunity of so doing, regardless of expense, so far as my limited means would permit, and thus after a long course of thirty-six years, I have become possessed of numerous species of considerable rarity, and of occasional appearance, respecting the indigenous origin of which, doubts and surmises have arisen,—other individuals are moreover in the like predicament from the same causes.

I have been led to these remarks from the fact, that of late there appears to be a growing disposition to strike the names of such uncommon species out of the indigenous list, solely from the hope in many cases, delusive though it be, of more speedily completing a collection, by diminishing the number of desiderata; and in some few instances, from the equally delusive wish *that they were not British*, from the apparent utter impossibility of obtaining them, by reason of their great rarity; I would therefore as a caution to Entomologists, before they so indiscriminately decide on the paternity of some of our

insects, call their attention to the subjoined facts, which might be extensively multiplied:—some of which, in result as to other insects, must have fallen beneath the notice of every practical collector, even of fewer years' experience.

For eighteen years I possessed four bleached specimens only, of *Thecla W-album*, having vainly endeavoured to procure others; when, in 1827, as elsewhere recorded,* I saw the insect at Ripley, not by dozens only, but literally by scores of thousands!!! and, although I frequented the same locality for thirteen years subsequently, sometimes in the season, for a month together, I have not since seen a single specimen there; but in 1833, I caught one specimen at Madingley Wood, near Cambridge.

Again, it was nine years ere I obtained that beautiful coleopterous insect, *Endomychus coccineus*; but behold! in September, 1816, it occurred on an alder-stump, in Coombe Wood, in such profusion, that I scraped the insects up by double-handsful; and since that period, now thirty years, although esteemed an insect of no great rarity, I have not taken, or seen living, half a dozen specimens.

The first visit I paid to Coombe Wood, *viz.*, on the 24th of May, 1810, I met with several specimens of *Pieris Cratægi*,† an insect I have never seen there since: and from 1810 to about 1816—7, *Limenitis Camilla* was not uncommon there, in July; it has now totally disappeared; as has likewise, *Vanessa C-album*, from Hertford, (where I used to find it in abundance), for nearly 30 years.

The influence of a new, or neglected locality must also be borne in mind; *e. g.* on the 14th of August, 1818, I captured in less than one quarter of an hour, and within a space of 50 yards, *Pontia Daplidice*!! *Argynnis Lathonia*, male and female!! *Aspilates gilvaria*, (of which Haworth says "*Exemplaria tria solum vidi*") and *Harpalyce galiata*, (then a desideratum with Haworth, after thirty years' experience), a score or two of each! *Gomphus flavipes*, male, to this day unique; as well as other rarities!! the two first insects then presumed not to be indigenous.

The addition of the more notorious circumstances in regard to *Colias Hyale*, recently, and *Vanessa Antiopa* formerly, may be alluded to; and I may also state that within these few months, my friend Mr. H. Doubleday, saw the rare *Erastria venustula*, (my pair of which

* Illustrations (Haustellata), vol. i, p. 77.

† For nearly thirty successive years, the late Mr. Haworth told me, he found this insect at Little Chelsea; about 1818 it disappeared from that neighbourhood.

have often been disputed to be British, as no other had turned up these fifty years), in plenty one afternoon, in Epping Forest, (in which locality mine were taken in 1792), but being unprepared, he visited the spot the succeeding day, at the same hour, and not a vestige of the insect was to be seen! Luckily he had secured two specimens in pill-boxes the first day.*

These are a few facts, gleaned from experience regarding some conspicuous insects, some, not uncommon, and others, formerly reputed foreign or unknown; which ought to open the eyes of practical entomologists, in respect to rarer ones, not chosing to turn up when "called for"; and ought to teach them not to doubt the origin of every species they cannot readily obtain; but alas! I fear such will never be the case.

Now with reference to the first fact; assuming, for the sake of argument, that I had never visited Ripley, or its vicinity; one example only, of Th. W-album, would have occurred to me in thirty-six years, so that I might, on the principles now deprecated, have questioned the origin of my old specimens till 1833, because I had not found the insect after twenty-four years' experience, nor seen a recently captured example, until I found the one at Madingley at that period.

Amongst the "outcasts" of the nature alluded to, I shall merely direct attention to the following, in illustration of my position.

Hadena amica? Of the insect, so called by me, I possess a male from Francillon's cabinet, and a female from Marsham's;—other old specimens also exist: and Mr. Lighton informed me that he had recently taken it near Bristol: it is now said to be American, and my friend Mr. E. Doubleday tells me it is the *N. arctica* of Boisduval, from northern Europe.

Graphiphora subrosea, Steph. has been doubted, "because it had not lately turned up." When I obtained the pair which are in my collection, I selected them from others taken at the time, and hardly sufficiently dry to place in my cabinet. If British, say the disputers, why does not it now occur? And as Boisduval does not know it, its fate has been sealed. But Boisduval says of *Celæna Haworthi*, "non *Apamea genuina*, *ut verisimile exotica*," an insect of which there exist scores of English specimens in collections. He knows not except from recent British examples, *Aspilates*? *multistrigaria*! although a not very uncommon London or Metropolitan insect.

J. F. STEPHENS.

Eltham Cottage, Sept. 1845.

* See Zoologist, p. 1085.

P.S. Since the foregoing was penned, many of our rarer Lepidoptera have turned up in plenty, viz. Sphinx Convolvuli, Deilephilæ Galii, Livornica and Celerio, (a doubted native), Acherontia Atropos, Mamestra nigricans? Graphiphora Dahlii, and "mirabile dictu,"! *subrosea*, of which about a dozen examples were found by a boy in August last, near Whittlesea Mere.

J. F. S.

E. C. September, 1846.

Report of the Microscopical Society of London.

October 14, 1846.—J. S. BOWERBANK, Esq., F.R.S., President, in the chair.

A paper by John Anthony, Esq., on a method of rendering the appearances in delicate structures visible, by means of oblique transmitted light. This method depends upon the placing the object in such a position, that the fine lines, or other delicate markings, are exactly at right angles to the illuminating rays when these lines, &c., will be at their maximum of distinctness; and thus tissues may be rendered distinctly visible, whose existence, when viewed in the ordinary manner, might be considered exceedingly doubtful. The object employed to illustrate this position, was the Navicula of the Humber, one of the most delicate of test-objects, which under ordinary circumstances appears perfectly transparent, but when viewed in this way, not only exhibits a double set of lines, but also transverse lines, giving the whole the appearance of being covered with a delicate net-work. Four drawings of this object were exhibited, showing it in as many different positions, making a complete revolution of the field in which the markings just mentioned were distinctly visible. In order to bring out these appearances, it is necessary that the light should be very oblique, and must be passed laterally through the "bull's-eye" in such a manner, that the object (the Navicula) may appear of an intensely blue colour, nearly opaque. The stage is then to be gradually turned round until the shell is in the position to be best seen as described.

November 11, 1846.—J. S. BOWERBANK, Esq., F.R.S., President, in the chair.

A paper was read by Mr. John Quekett, entitled "Additional observations on the intimate structure of bone." The author after allud-

ing to a previous paper on the same subject, read before the Society in March last, in which he described certain characters peculiar to the bones of each of the four great classes of the vertebrate kingdom, by which a bone of each class could be easily distinguished, and after pointing out the importance of the knowledge of this subject to the palæontologists and geologists, in enabling them to determine the nature of any fossil fragment of bone, however minute, he went on to state, that he had ascertained that the cells of the bone bore a certain relation in point of size, to that of the blood-discs; thus for instance, the blood-discs were found to be largest in reptiles, smallest in birds and Mammalia, and were in fishes of an intermediate size; and he had discovered that the bone-cells followed the same law. In the present paper, Mr. Quekett states the result of his examination of the structure of the bone of the perennibranchiate reptiles, *viz.*—the Syren, Proteus, and Axolotl, which have the largest blood-discs of all the Vertebrata, and he found that in them the bone-cells were the largest also, which fully bore out, and confirmed his former statement. Diagrams were exhibited which represented the bone-cells in the human subject, the ostrich, turtle, Syren, and Lepidosteus, when magnified by 453 diameters, by which means, their characteristic differences were rendered very evident.

A second paper by John King, Esq., of Ipswich, was read, on a method by which all objects may be polarized under the Microscope. The analyser consists of a double image placed over the eye-piece of the instrument, a plate of selenite is then put upon the stage, the edges of this field will then appear coloured, while the centre remains colourless. Any object introduced into this field will exhibit the effects of polarized light with great intensity, and purity of colour.

December 9, 1846.—J. S. BOWERBANK, Esq., F.R.S., President, in the chair.

A paper on the application of Polarized light in Microscopic observations, by Mr. Legg, was read. After noticing the remarks of Dr. Brewster, respecting the advantages likely to be derived from the application of polarized light in the microscopic examination of delicate structures, Mr. Legg described a series of polarizing apparatus, which may be readily adapted to almost any microscope, consisting, 1st, of a bundle of plates of crown glass, from which the light is to be reflected at an angle of 56° in which position one portion only of the light is refracted, and another transmitted, each of which positions consists of light polarized in opposite planes; this arrange-

ment is the best adapted to low single powers. 2ndly, a plate of tourmaline, as free from colour as possible, and cut parallel to the crystalline axis; and 3rdly, a Nicol's or single image prism, being a portion of a crystal of Iceland Spar, cut, and combined with a piece of glass, so as to throw out of the field of view one of the two images produced by the double refraction of the crystal. This he described as being the most eligible for the compound microscope, in as much as it is perfectly free from colour, and requires very little adjustment. He then described a series of experiments, illustrating the most striking phenomena of double refraction, in which he employed the Nicol's prism adapted under the stage. A double refractor, adapted to the eye-pieces, a film of selenite of uniform thickness, placed in accordance with its crystalline axis, and a plate of brass, perforated with holes from about one-sixteenth to a quarter of an inch in diameter. In the first of these experiments, in which the double refracting crystal was placed over the eye-piece, two distinct images appeared, one of which revolved round the other when the eye-piece was turned round, thus showing the ordinary and extraordinary rays. On the second, the Nicol's prism was applied under the stage, the other arrangements remaining the same. Upon turning the eye-piece, although two images are produced, but one is seen when half the revolution is performed, *i. e.* at 180° from the first position. Changes also take place at every other quadrant. In the third experiment the selenite plate was interposed, the images were now coloured and presented the complimentary colours at every quarter of a circle. When the hole in the piece of brass was of a large size, the images were seen to overlap and white light was produced. The author concluded with some remarks upon the service likely to be rendered to microscopical investigation by the employment of polarized light.

J. W.

Further notes on the Bones of Extinct Deer found in Ireland.

[The following letters are addressed to the Editor of the Farmer's Gazette, and appear in the columns of that highly useful periodical.]

1. *From Professor Owen of London.*

London, Dec. 7th, 1846.

SIR,—As you have done me the honor to refer to my work on British Fossil Mammalia [Zool. 1595], in regard to the question of the antiquity of the magnificent extinct species of deer (*Megaceros Hibernicus*)—the abundant remains of which are so characteristic of Ireland

I am induced to communicate to you one of the conclusions to which I have arrived, after inspecting the series of skulls of oxen, pigs, and the extinct deer obtained from Loch Gûr, near Limerick, by Mr. Nolan, to whose attention I am indebted for the view of so interesting a collection.

I limit myself, on the present occasion, to the notice of the remains of the Gigantic Extinct Deer, which you describe [See Zool. 1593, &c.] as "two female skulls, fractured on the frontals in precisely the same manner as those of the cattle," and which are described by Mr. Glennon—in the *Dublin Evening Post*, of November 14th, 1846, as "two of the undoubted skulls of the female giant Deer, agreeing in every respect with the male head, except in the want of horns."

The conclusion to which I arrived, after a careful comparison of these skulls with un mutilated skulls of the male and female Megaceros, in the presence of Mr. Nolan and another gentleman, is, that they do agree in every respect with the male head, except in the want of horns, which have been broken off, together with a portion of the frontal bone from which they grew, leaving that wide vacuity in the upper wall of the skull cavity, which has been conjectured to have been produced by the act of slaughtering the animals, in the same manner as the butchers of the present day do, by breaking in the frontal bone by some heavy instrument.

If I am right in my conclusion, that the skulls in question belonged to the male sex, and not to the female, of the Gigantic Megaceros, the improbability that a male of that species could have been killed by a blow between the horns, or that any human strength could have driven in a large piece of the frontal bone at that part, will be obvious to every anatomist, who knows that the skull of the male Megaceros is at that part specially strengthened, in subserviency to the support and wielding of the horns, by an enormous thickening of the frontal bone, forming a transverse bar of dense osseous matter, four inches in thickness. But nothing is more likely to happen than that, in the attempt to break off the antlers from the skull, the transverse connecting elevated portion of the frontal bones between the bases of the antlers should be wrenched away with them, leaving a wide central perforation, with splintering of the surrounding part of the skull, extending to the post-orbital processes; and this is precisely what has happened, in my opinion to the two skulls in question. But it may be asked, why, when the antlers have disappeared from the skulls, I should dissent from the opinions of Messrs. Nolan and Glennon, that these skulls belonged to the female. My reasons are the following:—

1st. They are larger than the skulls of the female, and they agree in size with those of the male. But to this it may be objected that they may have belonged to a different variety, and that probably the individuals increased in size under that state of domestication in which they are supposed to have been fattened, and knocked down by the butcher, when wanted for the feast.

The argument from agreement of size with the male's skull, it is true, will only have force if it concur with other and more conclusive correspondences. The skull of the male *Megaceros* is not only generally larger than that of the female, but particular parts are proportionately increased in express relation to its power of sustaining the enormous antlers, the weight of which ranges between 70 lbs. and 90 lbs. of osseous matter.

2nd. The occiput or back-part of the skull, for example, into which were implanted the strong muscles and powerful elastic ligaments, serving to bear up the head and its ponderous weapons, is not only absolutely broader in the male than in the female, but is considerably broader in proportion to the length of the skull: its ridges are stronger, its depressions deeper.

3rd. Again, the vertical plate of bone descending from the outside of the supporting surface of the antler to the zygomatic arch, and forming the back part of the socket for the eye, is twice as broad in the male as in the female *Megaceros*. And why? Because it helps to sustain the weight of the antlers.

Now, on comparing the two, so-called, fractured female skulls without horns, in Mr. Nolan's collection, with an entire and indubitable female skull, and with two unbroken skulls of the male; the fractured skulls, supposed to be female, presented these peculiar sexual character's of the male's skull, and many other modifications which relate to the existence of antlers, and which, as they would be appreciated chiefly by the physiologist, I will not further trouble your readers with.

"Facts," Mr. Editor, as you will observe, "are stubborn things," and those which I have the honor to submit to you, are conclusive with me against the domesticity of the *Megaceros*, so far as that hypothesis is founded on the supposed "discovery of two undoubted female skulls, fractured in the same manner as the butchers of the present day slaughter cattle."

I remain, Sir, your obedient servant,

RICHARD OWEN.

2. From H. D. Richardson, Esq., of Dublin.

Dublin, Dec. 16, 1846.

SIR,—My attention has just been invited to a letter from Professor Owen, which appeared in your paper of Saturday last, relative to certain skulls, of the extinct gigantic deer, recently found in the neighbourhood of Limerick, and described in a late No. of the Gazette. For your very kind and flattering allusion to my work on the animal in question, I beg to offer my sincere thanks; and, as no erroneous statements relative to any subject, but more especially to one possessing so much general interest as that of the great Irish deer, should be suffered to remain uncorrected, I have to request your permission to make a few remarks upon Mr. Owen's letter, which I shall do as briefly as possible.

That Mr. Owen is a man of no ordinary ability is sufficiently attested by the brilliant position, in the world of literature and science, to which he has attained; but his celebrity by no means renders him infallible, nor are the mere *dicta* of any man, however profound may be his philosophical acquisitions, to be implicitly received, far less bowed to as oracular, until after they have been duly and thoroughly investigated, and their actual *bond fide* value ascertained—even old Homer will be caught napping.

Aliquando bonus dormitat Homerus.

The eloquent Buffon fell into error, and subsequently admitted his mistake; and the immortal Cuvier was himself deceived relative to the very animal, respecting whose remains, I now feel myself reluctantly compelled to assert Mr. Owen also, to be, in the present instance, wholly mistaken. Mr. Owen, though a very great man, a very profound philosopher, and a comparative anatomist of the very highest standing, is, surely, in none of these respects, the superior of the mighty dead, whom I have just named, whose illustrious names shed lustre upon the age in which they lived, and upon the country which gave them birth; and when they could be mistaken, need Mr. Owen feel annoyed at being detected likewise in error?

The grand question at issue, with respect to the extinct gigantic deer, is, whether it was contemporary with man on the surface of this globe, or whether the stupendous remains of that animal, found in so many parts of this country, are but the relics of a former world, as yet untrodden by a human foot, upon which man had not as yet been placed by the creative hand of the Omnipotent Supreme. The for-

mer of these theories is an embodiment of my own opinions—the latter represents those of Professor Owen.

Two estimable and well known citizens of Dublin, Messrs. Nolan and Glennon, both enthusiastic in their researches after fossil remains, found recently at Loch Gûr, in the vicinity of Limerick, a quantity of such remains, including the skulls of various animals, among which were two or more of the extinct gigantic deer, and these skulls, those of the deer included, presented marks of violence on the frontals, as if they had been knocked down by the axe of some butcher of olden time.

The fact of the skulls of the deer having been found under such circumstances, was of course confirmatory in the highest degree of my opinions: demonstrating the deer to have not only existed contemporaneously with man, but to have been probably numbered among his domesticated animals, and, at all events, to have been slaughtered for food. Of course, whatever support was afforded to my theory by this singular discovery, was calculated to tell, with fatal effect, against that of Mr. Owen; and your having been kind enough to state your conviction of the correctness of my views, in the article already alluded to, called forth that letter from Professor Owen, to which it is my present purpose to reply.

A wide difference subsists between the skull of the male and female of the gigantic deer: the latter being destitute of horns, and the forehead of the former being furnished, from one temple to the other, with a solid ridge of bone, several inches thick, designed apparently to give support to those vast weapons, whose weight, in many specimens, approaches to one hundred pounds. The forehead of the male being thus protected, it was of course impossible that *he* could be felled by a blow of a butcher's axe; nor would the attempt have been safe, when his enormous power, and the formidable horns with which he was armed, are taken into consideration. To the slaughter of the female, however, no such obstacles presented themselves.

I am stating these circumstances for the sake of making my readers, in the first instance, so far acquainted with the actual form and character of the skull of the animal, as will enable them to form a correct estimate of the question at issue.

I now come to these individual skulls commented upon by Professor Owen. Previous to Mr. Nolan's leaving this country for London, he was kind enough to offer these skulls to my inspection, when I at once pronounced them to be the skulls of FEMALES: and further stated my conviction, that the fracture of the frontal bones had been the ef-

fect of human agency. Mr. Owen was the next who saw them, and my readers have been already made acquainted, by his own pen, with the conclusions at which he had arrived. These may, in brief, be stated thus: that the skulls in question were those of *males*, and not of females; and that the small cavity which appeared in the centre of the forehead had been produced by *wrenching off the horns*! It is thus that Mr. Owen proposes to destroy the overwhelming weight of evidence, that would otherwise spring into existence to the utter annihilation of his favourite theory. Not only, however, has the Professor failed of overturning the obvious, but certainly, awkward *facts* he dreaded, but he has made the attempt precisely in such a manner as to expose the weakness of his position, and show how untenable is his theory.

He says —“ The conclusion to which I arrived, after a careful comparison of these skulls with unmutated skulls of the male and female *Megaceros* in the presence of Mr. Nolan and another gentleman, is, that they do agree in every respect [with the male head], except in the want of horns, which have been broken off, together with a portion of the frontal bone from which they grew, leaving that wide vacuity in the upper wall of the skull cavity.” My reply is, that all these statements are inaccurate; and I am surprised at their coming from so eminent a comparative anatomist as Professor Owen. These skulls *do not* “agree in every respect with the male head, except in the want of horns” —for they *do not* possess the *peduncles*, or *foot-stalks*, from which the horns in the male animal spring. The horns also of the male Giant Deer *do not* grow from the frontal bone,” but are attached to the peduncles I have just mentioned, which are bony processes, springing partly from the sides of the head, and partly from the front, flanking as it were the strong bony fillet already described. Neither is the cavity in the centre of the forehead of the two female deer in question a *wide one*.

How very few must have been the number of male skulls of this stupendous animal, which Mr. Owen has had an opportunity of examining; and how abnormal must have been their structure, when an inspection of them could have suggested such extraordinary observations, as I have just quoted. It is, in the first place, next to impossible to form an accurate judgment from the inspection of one or two solitary specimens. While I write I have many dozen of these reliques around me, and many more at my command, on an hours' notice. I merely state this to palliate Professor Owen's mistake, and to account

for so humble an aspirant after the knowledge of nature's works, as I, venturing on its correction.

I have already stated that the peduncles form the basis of the horns; that they are of one piece with the solid bony frontal ridge, and I may just add, that around these peduncles, and at the side walls of the skull, the bone is comparatively thin, and connected with the afore-said ridge and peduncles, by *sutures*, or serrated joinings; what then is the inference to be drawn—*inference*, nay, such a word is too weak. What is the self-evident *CONCLUSION*—of course, that in the event of sufficient force being applied to the horns, the consequence would be, either their fracture at the thinnest part of the beam, their separation from the peduncles, the rupture of those processes, together with the frontal ridge away from the skull, or the breaking up of the whole head—but in no case could the effect of such violence be the production of a *small hole* in the centre of the forehead. What, in Professor Owen's assumed case, became of peduncles and ridge, and how came it that the orbits and zygomata remained unfractured.

Any of my readers who may feel sufficiently interested in this subject may call at Mr. Glennon's shop, No. 3, Suffolk-street, Dublin, where they will be shown the heads both of the female and of the male of the gigantic deer; as, also, two male heads, to the horns of which, force was applied, with a view of ascertaining the effect that would be produced. In one instance the force had been applied to the beam of the horns, and the consequence was their fracture where they are united to the peduncles. In the other instance the force was applied to the peduncles themselves, with a view to ascertain whether it was possible to wrench them and the ridge away from the fan, the consequence was, that the skull was riven asunder, just as I have described. Mr. Owen, while dilating so truthfully upon the strength of this portion of the skull, seems quite to have forgotten that the same strength which could so successfully bid defiance to the blows of the butcher's hatchet, would as effectually resist any attempt to separate it from the remainder of the skull without causing the rending and separation of the entire structure.

For the sake of Mr. Owen's reputation, it is to be regretted that he should have put forward such preposterous assertions; and it were also no less desirable that he should have stated whether or not he conceived the *surface* of the frontals, in these skulls, to display any evidence of having had the great frontal ridge *filed down, cleft away, or removed from it in any other manner*. I do not think that Mr. Owen's assertions require any farther refutation; and I also dread

trespassing upon your space, but I scarcely think, that, in justice to the subject, or to Mr. Owen, I can close my paper without one or two other remarks.

It appears that Mr. Owen conceives these skulls to present the sexual characters of the male, *viz.*, greater breadth in proportion to their length, than is to be met with in those of the female; as well as more marked development of certain elevations and depressions, supposed to possess a relation to the vast horns characteristic of the male animal. Had Mr. Owen asserted these heads to be those of a *monster*, that is, an *undeveloped male*, his positions would have been less extraordinary, though even had he done so, he would have been called upon to explain why developments connected with the presence of horns, existed, when those horns themselves were not present to require them; as well as other matters which, should he now adopt my suggestions, and try "on the new tack," I shall not be backward in adducing,—but as he has asserted that the frontal fracture was produced by *wrenching off the horns*, the Professor must recant that theory before he can embark upon the new one. For my own part, I merely observe, that the superior developments of which Professor Owen speaks, are not uncommon, nor would he have conceived them to be so, had he possessed an opportunity of examining a sufficient number of the skulls; for I can inform him, that the skulls of the giant deer, both male and female, present many discrepancies from each other, evident to any comparative anatomist, who has an opportunity of inspecting them; nor should Mr. Owen have so soon forgotten the *large size* of these skulls, so obviously producing an increased development of parts, but which he only noticed as furnishing an inference of their belonging to the male—besides which, what had become of the ridge and peduncles? Had Professor Owen the advantage of examining a number of these skulls, he would also have been more cautious in basing a theory upon a foundation so very unstable, as variety in size—a foundation at once unstable and unphilosophic.

There are other circumstances connected with the discovery of these remains which demand explanation from Mr. Owen, but from all mention of which he has apparently shrunk. I allude to the fact of these skulls having been found in company with the skulls of many well-known domestic animals—such as the ox, the goat, the hog. These latter skulls were *similarly fractured*. As also spear-heads, hatchets, and other utensils, and chiefly of a domestic nature, among which was a knife-handle of curious workmanship, since presented by

Mr. Nolan to that eminent archæologist, the celebrated Crofton Croker, from whom also Mr. Nolan received the very interesting, and in my opinion important, information, that the meaning of the name Loch Gûr, is not Lake of the Goats, but Lake of the Great Assemblage.

Is this nothing? Yet Professor Owen has passed over this important *fact*. It was certainly an awkward one to meddle with; but surely to pass it over in total silence is scarcely fair, especially as it bears so strongly on the point at issue, analogically and collaterally supporting the other circumstances.

In conclusion, I may observe that the discovery of these heads are further most important on the following account:—Naturalists had hitherto been in the habit of describing a small, and comparatively unknown skull, of which there are specimens in the British Museum and elsewhere, as that of the female of the Megaceros. Indeed I may add, that I, among the rest, fell into this error, which I now willingly avow. Now the TRUE FEMALE is found. I unhesitatingly assert these new heads, found at Loch Gûr to be so; and that skull which has hitherto been regarded as such, to belong to another variety, of inferior size and less strongly marked development. Let Mr. Owen go to the British Museum, and he will see *another variety*—a male described by me some time back in the columns of this paper. I design on a future occasion to return to this portion of the subject; but beg Mr. Owen first to reply to my objections.

“Facts,” Mr. Editor, to employ your own words, so *facetiously* reiterated by Professor Owen, “are *stubborn things* ;” and I leave it to the judgment of any impartial person whether Mr. Owen has adduced a single *fact* calculated to shake his belief in those detailed by you in the able article which evoked his letter.

Yours, &c.,

H. D. RICHARDSON.

Additional Note by Mr. Richardson.

TO THE EDITOR OF THE ZOOLOGIST.

SIR,—Perceiving upon the cover of your excellent periodical for this month an announcement of your intention to republish the correspondence which recently took place between Professor Owen and me in the ‘Farmer’s Gazette,’ I take the liberty of requesting your permission to correct an error into which I had inadvertently fallen, from following, without investigation, a statement put forward by Professor Owen,

relative to the thickness of the *frontal ridge* in the skull of the male gigantic deer. Mr. Owen stated this portion of the frontal bone to be *four inches in thickness*, and I, not conceiving it likely that *he* would err in so palpable a matter, adopted his assertion and admitted that portion of the frontals to be *some inches in thickness*. Subsequently, however, I had *sections* of the skull made, and the result was that I found the thickness to be only apparent; the portion of ridge, between the peduncles, being only *one inch* and one-eighth of an inch thick; the interior of the skull-cavity following the course of the external protuberance. I am glad that I made these sections, (for permission to do which, I have also to return thanks to the proprietor of the skull so cut, Mr. Glennon), for I conceive that this furnishes an additional fact to aid in showing the impossibility of these skulls found fractured at Loch Gûr having been those of males, and consequently is striking another blow at the foundation of Professor Owen's theory.

I have the honor to be, Sir,
Your's, &c.

H. D. RICHARDSON.

[I am quite content to leave to Mr. Richardson the task of defending the so-called female skulls scientifically and philosophically: I am too well acquainted with Professor Owen's knowledge of comparative anatomy to enter into a contest in which I must *appear* in the wrong. Nevertheless, having advanced an opinion, which I have no reason to rescind; and seeing, moreover, that Professor Owen treats the matter with that winning pleasantry which is so natural to him while defending any hypothesis he may have been pleased to broach; I believe it consistent with my editorial capacity to continue a discussion that seems so agreeable to all the parties concerned. Let us for the present regard the *question of sex* as a moot point open for the consideration of the learned, and consider the *question of fracture* independently of sex. But first a word on the general question of antiquity. Professor Owen must be acquainted with Mr. Wilde's paper, published in the first volume of the Royal Irish Academy's Report, and recording the discovery of a vast quantity of skulls and other bones, principally of horned cattle, deer, goats and swine, near the village of Dunshaughlin. The skulls presented the marks of frontal fracture already described, and in one of them was actually found the head of the instrument with which the fracture was supposed to have been made. Now no doubt has yet been raised as to the cause of the death of these animals: it is universally attributed to the frontal fracture, and again, that frontal fracture is attributed to the hand of man. Should any one incline to contest this, and contend for their pre-adamite existence, let him read Mr. Wilde's account of the receptacle in which they were deposited:—

“About a mile to the east of the village of Dunshaughlin, on the

townland at Lagore, and near the margin of a "cut-away" black bog, is a circular mound, slightly raised above the surrounding plain, its highest central part being about eight feet above the margin, and the circumference of the mound measuring 520 feet. A small stream passes through this circle; and the whole bog in which it is situate occupies a slight concavity of about a mile and half in circumference, bounded by raised tillage and pasture lands. Within the memory of some of the old inhabitants of the neighbourhood, this bog was covered with water during the greater part of the year, and it is so invariably during winter, up to the present period. A large pond is still in existence in one of the fields adjoining the mound. (Mr. Wilde exhibited a map of the mound and the surrounding country). A few years ago, some labourers, while clearing the stream-way, discovered several bones protruding from its sides; and in May, 1839, the quantity of bones found in the drain was so great, and their value so well known, that a further examination was made, when it was discovered that the greater part of the mound was composed of the remains of animals, placed there in the following manner—

"The circumference of the circle was formed by upright posts of black oak, measuring from six to eight feet in height; these were mortised into beams of a similar material, laid flat upon the marl and sand beneath the bog, and nearly sixteen feet below the present surface. The upright posts were held together by connecting cross beams, and fastened by large iron nails; parts of a second upper tier of posts were likewise found resting on the lower ones. The space thus inclosed was divided into separate compartments, by septa or divisions that intersected one another in different directions; these were also formed of oaken beams, in a state of great preservation, but joined together with greater accuracy than the former, and in some cases having their sides grooved or rabbetted to admit large panels driven down between them. The interior of the chambers so formed were filled with bones and black moory earth, and the heap of bones was raised up in some places within a foot of the surface. It was generally found that the remains of each species of animal were placed in separate divisions, with but little intermixture with any other; and the antiquities, &c., were found along with them, without any order or regularity, but for the most part near the bottom."

Mr. Wilde does not mention the presence of the giant deer among these remains, but I am credibly informed that it occurs there, although the horns have not yet been found. I have not before me the exact date of Mr. Wilde's paper, but, being in Dublin in the autumn of

1839, I had an opportunity of seeing some of the skulls, and as far as I recollect, the discovery was then a very recent event. The skulls of cattle are not identical with those now domesticated in Ireland, and serious doubts were entertained by the most eminent naturalists, as to what species of *Bos* they could with propriety be referred. Similar skulls have been found in various parts of Ireland, and now again occur at Lough Gûr, as recorded in the *Zoologist* (Zool. 1591). The manner in which these bones have been buried, the frontal fracture when it occurs, and the concomitant presence of human implements, all point to the conclusion, that the living cattle were at *some* period co-existent with man, although we are at present without any sufficient clew to the exact date of this co-existence. I could, without difficulty, mention a number of instances in which the bones of these extinct breeds of cattle and those of giant deer have occurred together, but as this is debatable ground, I will only cite the recent instance at Lough Gûr : can there exist a sceptic on this point ? And if not, we may proceed a step further : the bones of the deer and the cattle not only occur in company, in similar situations and under similar circumstances, but their condition is similar, they all still contain that large proportion of animal matter, which implies the comparatively modern date of their existence. This has to be accounted for, and we find that "the presence of animal matter, and the peculiarly fresh and recent appearances of these remains, is to be attributed to the antiseptic properties of the turf or bog in which they are found." This seems rational, but why should it apply solely to the giant deer ? Why not to the slaughtered oxen ? Why not to the slaughtered swine ? Why not to human bodies ? Why are not all organic remains thus preserved alike pre-adamite ? Professor Owen seems to have caught a glimpse of this argument ; at any rate, he has found that the bog is not quite old enough for the purpose ; he therefore removes the deer-bones beyond the reach of bog and bog-water, and thus loses the benefit of their "antiseptic properties : " he "met with no person who had seen them in the peat itself," they were invariably "dug out of the lacustrine shell-marl beneath the peat or bog-earth." My readers will doubtless see how diametrically opposed are these two ways of establishing the antiquity of the bones under consideration ! Now for the frontal fracture. Here are certain skulls of deer, cattle and swine found in company, and so similar in their state of preservation, that the most skilful geologist cannot decide on the greater antiquity of either : all these animals have a manifest frontal fracture, and the apertures are so similar that they might all have

been made by one instrument. It will be seen from Professor Owen's letter, that he singles out the giant deer for a hypothesis of his own : this is quite fair on his part, because the debate refers to them only, and not to the cattle or swine : the hypothesis is that the hole in the forehead was made by wrenching off the horns. This appears strange even as applied to the two disputed skulls, but I shall not debate the matter, because I have no doubt that I should be defeated in any attempt I might make to show the improbability of a central frontal fracture being caused by wrenching off the horns. I wish to take a more general view of the case : side by side with the skulls of the deer are those of bullocks, with similar fractures, and I of course seek a similar solution for them ; but unfortunately, the slug or bony base of the horn is still present in these skulls, so that the horns of the bullocks can scarcely have been wrenched off. Again, the frontal fractures occur in the skulls of swine, and surely in this animal they could not proceed from the same cause ! I will not however make too sure of this, since I am not perfectly fearless of a hypothetical porker adorned with antlers (*Ceratochærus ramosissimus*), seeing how valuable an auxiliary he would be in support of the wrenching hypothesis ! But supposing the frontal fractures in all their marvellous and workman-like uniformity could be occasioned by wrenching off the horns of deer, bullocks, and Ceratochæri, may I venture to ask by what power was the wrenching operation achieved in those pre-adamite ages ? Was it the effect of wind or wave ? Was it by muscular exertion ; and if muscular, was the agent beast, or bird, or reptile, or fish ? Reader ! listen ! a hypothetical rhinoceros has been got up, who, with a talent peculiar to his country, is to play into Professor Owen's hands, by rushing pell-mell among Milesian bulls and pigs, and sticking his nasal horn into the very centre of their frontals ; and all this is for the purpose of showing that Professor Owen's wrenching hypothesis is perfectly plausible, and in the highest degree probable !—*E. N.*]

[P.S.—I have received most extraordinary letters since this matter was noticed in the Preface to the 'Zoologist.' The *first* of them, which might really be made a fair ground for an action at law, after informing me that the ultra-scientific world in general, and the ultra-scientific writer in particular, are highly incensed at my "having dared to express opinions at variance with those of Professor Owen," actually goes on to threaten that means will be used (in the words of a great civic authority) to "*put down*" the 'Zoolo-

gist'! The writer is respectfully informed that when it becomes necessary to suppress truth or conceal opinions in order to obtain a sale for the 'Zoologist,' I will take into consideration the propriety of doing so, and publish his letter, which *virtually* recommends such a course, as a prelude to this change in the plan of management].

[2nd P.S.—A long letter has just reached me from Mr. Glennon; I extract this interesting passage.—“I have lately obtained a skull of the giant deer, with portions of fatty matter, flesh and skin still attached to the forehead and lower part of the head; the fatty matter bore the impression of coarse hair, and burned readily when held in the flame of a candle.” Other extracts from this letter will be made hereafter.—*E. N.*]

Notice of the late Mr. Crowther, of Manchester.—The death of this remarkable man is doubtless known to most readers of the 'Zoologist,' but probably few are acquainted with the extent of his merits, both as an entomologist and a botanist. He had acquired, under unfavourable circumstances, a great amount of knowledge, although, as frequently happens, others contrived to reap the credit of his researches. In conjunction with his friend E. Hobson, Roland Detrosier, and a few others, he took part in the formation of the Banksian Society, a body of naturalists chiefly from amongst the working classes, which flourished for some years. Afterwards it was united with the Manchester Mechanics' Institution, where its weekly meetings were held for some time. Latterly, however, they have, as I am told, been discontinued, and the Museum chiefly, if not entirely, dispersed, owing to the growing rage for light literature and amusements. As was stated in the Manchester Guardian, several of the scientific companions of the deceased still survive, and are at once a pleasing and a painful sight. It is pleasing to see, in men whose days are consumed by manual labour, such a love for natural science, and such great acquirements,—so great, indeed, that if honours were always awarded according to merit, many an F.R.S. (not forgetting the author of 'Errors in Chemistry, &c.'), would have to yield precedence to these rustic philosophers. At the same time it is painful that such talents should be so little fostered and appreciated. There is in Lancashire an astonishing love for science: within a few miles I could point out entomologists, botanists, chemists, mathematicians, of sterling merit, amongst the working classes, many of whom, if they had access to books, museums, &c., must have held distinguished positions; but turned upon Nature, as they too often are, without other guide than their own powers of observation, and compelled to discover anew for themselves much that is already known, can we wonder that their progress is not greater, or that they frequently take up erroneous and antiquated views? It was at one time hoped that the Mechanics' Institutions would have afforded such men the needful aid and guidance, but they seem at present more engaged with frivolity than with science.—*J. W. Slater.*

Remark on a passage in the 'Fauna of Moray,' by the Rev. G. Gordon.—On looking over, a short time ago, the Paper bearing the above title, which appeared in an early number of the 'Zoologist,' I was surprised to find the reverend writer, in speaking of the rabbit, reiterating what he is pleased to call the "wise resolution" of Sir Robert Peel, who is reported to have said, whilst addressing his tenantry, "I consider it to be the duty of every landlord to make some sacrifice of his personal pleasures for the tenant farmer:" (so far well); and "I have no hesitation in saying, that I shall be pleased that there is no one single rabbit on the whole of my property—I will do everything I can for their destruction." As an argument against such wholesale and unqualified destruction, let me refer Mr. Gordon to the few following sentences selected from an eminent writer (Smellie), and the truth of which will be at once felt by every naturalist of thinking and philosophical mind. "To men of observation and reflection, it is apparent that all the beings on this earth, whether animals or vegetables, have a mutual connexion and a mutual dependence on each other. There is a graduated scale or chain of existence, not a link of which, however seemingly insignificant, could be broken, without affecting the whole. Superficial men, or which is the same thing, men who avoid the trouble of serious thinking, wonder at the design of producing certain insects and reptiles. But they do not consider that the annihilation of any one of these species, though some of them are inconvenient and even noxious to man, would make a blank in Nature, and prove destructive to other species which feed upon them. These, in their turn, would be the cause of destroying other species, and the system of devastation would gradually proceed, till man himself would be extirpated, and leave this earth destitute of all animation."—*Thomas Worthington Barlow; Holmes Chapel, near Middlewich, July, 1846.*

Hedgehog devouring Eggs.—About six weeks ago a gentleman in this town who keeps poultry, was surprised to find, two or three days in succession, a diminution in the number of eggs laid by his fowls. It occurred to him that a polecat or weasel might be the cause of these depredations: this induced him to watch, and on the first night, hearing a noise among the fowls, he entered their dormitory, when the whole mystery was immediately solved, for there he saw a hedgehog in the act of devouring an egg, which the animal endeavoured to conceal under its body upon his approach. The little pilferer was captured, and permitted to enjoy his liberty, though at some distance from the scene of his late *festivities*. I do not know what the defenders of this interesting creature may think of the fact I have related; I must own it has led me to conclude that there is a *great deal* of truth in the accusations brought against this animal by the mass of gamekeepers.—*E. J. R. Hughes; Catherine Street, Whitehaven, August 14th, 1846.*

The Stoat carrying Eggs.—The following anecdote seems to me interesting, as explaining in some degree the mode in which eggs are so mysteriously moved, without breaking, by small predatory animals. The narrator, who is a very accurate observer, declared to me that he has the most perfect recollection of the facts. Mr. Edward Hunt was walking with a brother of his near Cheltenham, some thirty years ago, when they saw a stoat cross the road, carrying something white between its chin and its breast: upon their running up it dropped its burden, which proved to be a full-sized hen's egg; examining it, they could not detect the slightest marks of teeth upon the shell. They put it down again, and retired to a little distance, when the stoat returned, and carried it, in the same manner as before, up a high bank and through a hedge. The egg appeared to be held by the head and neck, without being carried at

all by the fore paws of the animal, which were used in running. This story is less marvellous than the old one of the rats using one of their companions, lying on his back, as a sledge, and his tail as the harness.—*J. Wolley* ; 26, *Mount Street, Grosvenor Square, November 20th, 1846.*

Anecdote of a Kitten swallowing a Steel Skewer.—A circumstance has lately come under my notice, which you may perhaps deem worthy of a place in the ‘*Zoologist*,’ although it appears to me of so extraordinary a nature, that unless I had known it as a fact I think I should have been inclined to disbelieve it. A black kitten, in the house in which I resided, had appeared for several days to be very unwell, and was continually straining, as if to get something up from its throat which was incommoding it. This (as I said) continued for some time; when a gentleman one day, while examining it, perceived, about two inches below the chin, a hard point projecting almost through the skin. This at first he thought must be a bone, but upon further examination it appeared to be a steel point, which he easily forced through the skin, and after making a small incision about it he could draw it further out, which he did; and to his surprise it proved to be a steel skewer of more than seven inches in length, which, as is usual, had a small ring at the end of it; it had also a small piece of string attached to it, on which I suppose the kitten had found a piece of meat. In trying to swallow this, it must have got the skewer so far in its throat that it could not get rid of it again. The kitten is now thriving, and promises to be a fine cat.—*E. E. Montford* ; *East Winch, near Lynn, Norfolk, December 28th, 1846.*

Occurrence of Scotophilus serotinus at Folkestone.—While staying at Folkestone, in the latter end of August and beginning of September, I noticed bats, of a rather large size, very plentiful: having obtained a few specimens, I found they differed notably from the *Noctula*, the commonest of our large-sized bats. On showing them to Mr. Gray, of the British Museum, he pronounced them to be the *serotinus*. I believe the only hitherto recorded British locality for that species is the neighbourhood of London.—*H. N. Turner, Jun.* ; 1, *Upper Belgrave Place, Pimlico, November 23rd, 1846.*

Habits of Roman Dogs.—“As we are on the subject of dogs, I may as well notice some particulars of the habits of this animal in connexion with the general subject. Louis* Bonaparte (Prince of *Canino*), brother-in-law of Mr. Wyse, and rival of Charles Waterton in knowledge of brute instincts, has drawn the attention of naturalists to the system of life pursued by the dogs of Rome. You are aware that no sewerage exists here, except the *cloaca maxima*; and that, having no regular dustmen or street contractors, the inhabitants are accustomed to throw out the garbage and refuse of their houses, which is deposited generally in some blind corner appointed for that purpose by the police, and decorated with a large inscription on the wall, *IMMONDEZZAIO, i. e. ‘rubbish shot here.’* It appears that though several hundreds of these established dépôts exist in Rome, not one is unappropriated, but has become, by usurpation or regular transfer, the fee-simple of some particular dog, who will not suffer his rights of *flotsam* and *jetsam* to be invaded by any squatter or new comer, but rules supreme master of the dung-heap he has acquired. Some cases of co-partnership in a corner have been observed, but generally with brothers on the death of the parent; and desperate battles occur occasionally about ‘fixity of tenure,’ as in Tippe-

* So in original, but certainly *Charles Lucien*.

rary. The unsuccessful claimant, on ejection, has no resource but the general run of the streets:—

‘Heu! magnum alterius frustra spectabit acervum!’”

—From a letter dated “Rome, Jan. 28,” in the *Daily News* of Feb. 8, 1847.

Anecdote of American Pigs.—“As we approached a farm on the American side of the St. Clair river, belonging to the captain of our steamer, a curious fact fell under my observation: the pigs belonging to the farm came squealing down to the water-side, a thing which the persons at the farm assured me they never did when other steamers passed. The captain explained this singular recognition on the part of the pigs by stating that the swill of his steamer was always preserved for them; and that on reaching the landing-place, it was immediately put on shore to feed them. The animals, having been accustomed to this valuable importation during the whole summer months, had learned to distinguish the peculiar sound which the steam made in rushing through the pipe of the steamer; and as they could do this at the distance of half a mile, they immediately upon hearing it hastened down to the river, whilst the noise made by the other steamers was disregarded. This is a curious instance of the possibility of sharpening the faculties of the lower animals by an appeal to their appetites; and a conclusive proof that the readiest way to make all swinish animals reasonable, is to provide plenty of swill for them.”—*Featherstonhaugh’s ‘Canoe Voyage up the Minnaw Sotor,’* i. 125.

An Unicorn.—A few days ago, while the workmen on the Newcastle and Berwick Railway were excavating a portion of the line near to Bothal Castle, they found a skeleton of an animal having a single horn growing from the centre of the forehead. The workmen made a present of it to Mr. John Cragg, watchmaker, Morpeth.—*Newcastle Advertiser*.

Dates of the arrival of Summer Birds at Selsey, Sussex, in 1845 and 1846.—

1845.

April 7th.	Redstart, <i>Phœnicura ruticilla</i> .
„ 10th.	Hoopoe, <i>Upupa epops</i> .
„ 11th.	Willow warbler, <i>Sylvia trochilus</i> .
„ 12th.	Wryneck, <i>Yunx torquilla</i> .
„ 20th.	Nightingale, <i>Philomela lusciniæ</i> .
„ 21st.	Martin, <i>Hirundo urbica</i> .
„ 21st.	Chimney swallow, <i>Hirundo rustica</i> .
„ 21st.	Yellow wagtail, <i>Motacilla flava</i> .
„ 22nd.	Whinchat, <i>Saxicola rubetra</i> .
„ 23rd.	Reed warbler, <i>Salicaria arundinacea</i> .
May 1st.	Sedge warbler, <i>Salicaria phragmitis</i> .

1846.

April 20th.	Wheatear, <i>Saxicola ænanthe</i> .
„ 20th.	Nightingale, <i>Philomela lusciniæ</i> .
„ 23rd.	Blackcap warbler, <i>Curruca atricapilla</i> .
„ 24th.	Willow warbler, <i>Sylvia trochilus</i> .

- April 24th. Chimney swallow, *Hirundo rustica*.
 „ 24th. Whinchat, *Saxicola rubetra*.
 „ 24th. Yellow wagtail, *Motacilla flava*.
 „ 24th. Reed warbler, *Salicaria arundinacea*.
 „ 24th. Chiff-chaff, *Sylvia hippolais*.
 „ 24th. Lesser whitethroat, *Curruca sylvicola*.
 „ 25th. Wryneck, *Yunx torquilla*.
 „ 26th. Sedge warbler, *Salicaria phragmitis*.
 „ 26th. Martin, *Hirundo urbana*.

—*F. A. Chennell* ; Guildford, Surrey.

Notes of Birds in Brazil.—"The notes of birds were of course as varied as their kinds, that of the parrot tribe being particularly disagreeable, not unlike that of the English rook; but the sound which most particularly caught my ear, was the monotonous and distinct cry of the Bem-te-ve, a bird about the size, shape, and colour of the thrush. This name has been given to it from the resemblance of its note to the Portuguese, signifying 'I see you well,' which it repeats in quick succession."—*Travels in the Interior of Brazil*, by *George Gardner, F.L.S.*

Occurrence of Rare Birds near Ipswich.—Long-tailed duck (*Anas glacialis*). A fine young male came into my possession two months since, during very mild weather: he was killed at Aldborough, where this species is considered very rare; indeed it is never seen on this coast except in extremely cold weather.

Common bittern (*Botaurus stellaris*). Several specimens have been obtained in Norfolk and Suffolk, during the late severe weather; one, a female, in beautiful plumage, came into my hands soon after it was killed.

White-tailed eagle (*Haliaeetus Albicilla*). A fine example of this somewhat rare bird was shot on the coast while preying on a common gull. The specimen, which is now in my possession, was presented to the Ipswich Museum.

Little auk (*Mergulus Alle*). Several instances of the occurrence of this species on our coast, and even far inland, have lately come to my knowledge. One, in my own collection, was found exhausted not far from this town.—*F. W. Johnson, Surgeon*; Ipswich, Suffolk.

Adult Male Sparrow-Hawk in plumage of Female.—Towards the end of September a highly valued friend in Hertfordshire sent me a fine specimen of the common sparrow-hawk (*Accipiter Nisus*). It had the plumage common to the female and young male, but was of the size of the former, which I presumed it to be. On opening it, it proved to be male.—*H. N. Turner, Jun.*; 1, Upper Belgrave Place, Pimlico, Nov. 23rd, 1846.

Occurrence of the Great Gray Shrike at Downham.—A female specimen of the great gray shrike (*Lanius Excubitor*) was killed near here the beginning of this month. Several specimens have been obtained in this neighbourhood during the last twelve months.—*C. B. Hunter*; Downham, Norfolk, November 23rd, 1847.

Observations on the Cuckoo.—Mr. Beech, a bird-stuffer in Droylsden, gives the following remarkable particulars concerning the young of the cuckoo. Having noticed a cuckoo's egg in the nest of a "peat" (meadow pipit), he determined to watch in what manner the eggs or young of the pipit would be removed. Coming up to the nest one day he found the old birds absent, the young cuckoo in sole occupation of the nest, and two young pipits on the ground outside. As the cuckoo seemed far too feeble to have ejected them, he replaced the two young birds in the nest, and hid him-

self near at hand to await the result. The parent birds soon returned, and immediately threw out their own offspring to make room for the parasite. This statement differs widely from the common opinion, and deserves closer investigation.—*J. W. Slater; Manchester.*

Nudity of the base of the Rook's beak.—Mr. Waterton's rook began to drop the bristles at the base of the bill, in the autumn of its birth, without being allowed to dig. A rook hatched last May, passed its autumnal moult, shedding its nasal feathers, which were perfectly renewed in due time: early in December these new feathers began to fall off slowly, *beginning at the very base*, while those farthest from the root are, even now, shining, clean, and otherwise perfect, although the bird has always had the range of a garden, in which it has dug many pits, deeper than its own bill, and its constant amusement is to root up every flower which it can master, and that, on an average, was all of them. On the whole, I should think that it had as much practice at delving, as any rook in the shire: how comes it that Yarrell scouts the idea of the nudity being an "original peculiarity?"—*Henry Daniell; Lambert House, Bath, Jan. 14th, 1847.*

Robins at Sea.—A lady, now with us, who has just returned from India, by way of Alexandria, on board the *Erin*, says, "that during nearly the whole of the passage from Malta, there have been numbers of robins daily alighting on the decks, and entering the port-holes. They appeared to be quite exhausted, and freely allowed themselves to be taken." The lady well knows what a robin is, or I should have thought her mistaken as to the bird's identity. Has such a fact ever been noticed before? I think one of your correspondents in the '*Zoologist*' was making some odd supposition and query as to what became of the old robins. I have not time just now to hunt it up, but if I am right that such was the case, and if my friend has not mistaken some other bird for the robin, it seems to be pretty clear they migrate, which will be a sufficient answer to your correspondent. I forget what day she sailed from Malta, but she arrived at the Mother Bank on the 10th of this month, and the robins appeared on the decks right up to the coast of Britain.—*Henry Deane; Clapham, Nov. 13th, 1846.*

Occurrence of the Fire-crested Regulus near Truro.—The occurrence of three examples within the last month of this interesting species, in the neighbourhood of Truro, was made known to me by Mr. J. S. Passmore, of Truro, two of which I had an opportunity of examining on Tuesday last. One of these had been obtained on the morning of my visit, and Mr. Passmore informed me that he was pretty sure of getting another which he saw in the same locality. The individuals I inspected were a male and female; the crest of the latter had a greater portion of the *orange red* than the female, which I reported to you some time past as having passed into my possession, exhibits,—the colour of which is lemon yellow. I conclude, therefore, that the red crest in the female is assumed by more adult birds.—*Edward Hearle Rodd; Penzance, January 13th, 1847.*

Occurrence of the White-winged Crossbill in Cumberland.—I saw male and female adult birds of this species, and a young male bird, that were shot by Mr. Thomas Bond, of Swinstead House, near Brampton, Cumberland; he succeeded in shooting nine specimens, I believe five males and four females, in company with the common crossbill. The occurrence of this rare species may be interesting to some of your ornithological readers, which induces me to forward the information.—*James B. Hodgkinson; Preston, November 28th, 1846.*

Late stay of Swallows and Martins at Springfield, Warwickshire.—On the 18th of

November last, I observed a number of Hirundines, as many as fifteen or twenty, sporting at some height in the air over the Ponds at Springfield, near Temple Balsall in this county. From their distance, I was not able satisfactorily to ascertain which species of our three common swallows these birds belonged to, but my impression is that they were chiefly house martins (*Hirundo urbica*); one however, out of the number, I feel no hesitation in saying, was a common swallow (*H. rustica*). I have frequently seen single individuals of our Hirundines much later in the year than the 18th of November, but never before recollect to have seen so great a number together at that late period. I may add that several specimens of the hawfinch (*Coccothraustes vulgaris*) have been shot here this winter, and many more seen.—*William Bree, B.A.; Allesley, January 2nd, 1847.*

Swallows in January.—I myself saw in the afternoon of January 18th, 1837, on New Miller Dam, near Wakefield, three swallows sporting and dipping and hawking as in the midst of summer: the day was very mild and still.—*J. Johnson, Jun., Collegiate School, Huddersfield, November 24th, 1846.*

*Note on the rearing of Kingfishers.**—When a boy, being esteemed a great connoisseur in birds, two men brought to me a nest of young kingfishers, consisting of five or six, I forget which; I well remember they had no feathers, and you could scarcely perceive the stubbs in the wing, where the feathers first make their appearance. They were what the boys at school used to call single-stubbed. I should conceive they could not be more than a week or a few days old. I gave them nothing but minnows to eat, and with that food alone, they were reared till they got their wings, and flew away. I shall forbear to mention the quantity of minnows the birds ate in the twenty-four hours, as it would appear to exceed all credibility. The men who brought them to me were digging chalk, and observed the kingfishers going in and out of a hole in the chalk-pit, and as they told me, the nest was found nearly a yard in from the outer opening.—*Philip Henry Poole; Littleton Farm, 20th June, 1828.*

Habits of the Kingfisher.—In an interesting notice of the habits of the kingfisher, in the December number of the *Zoologist*, p. 1551, Dr. Morris mentions the propensity of the bird, in certain situations, to suspend itself in the air, and hover like a kestrel over the water, before it seizes its prey; and this he considers a *deviation* from the bird's usual habits. I beg to state, that this hovering in the air in search of food, is by no means an unusual thing with the kingfisher. Even in this midland county the bird may occasionally be seen *playing the kestrel* over our rivers and smaller brooks, where there is no lack of twigs, bushes, &c., on which to sit in ambush for its prey, if it preferred doing so. I once saw a kingfisher poise itself in the air, and hover for some seconds over the river Blyth, five or six feet above the surface, when on a sudden it dropped like a stone into the water, and brought up a moderate sized bleak, with which it flew a short distance to the root of a neighbouring tree, and there giving the bleak one turn in its bill, swallowed it whole with the greatest apparent ease. I should not have supposed it possible, had I not been an eye-witness of the fact, that so small a bird would have swallowed a fish of the size, or stowed it away wholesale in its stomach. The kingfisher, it is well known, is a shy bird; but the quiet patient angler has sometimes an opportunity of making a very near inspection of its ways and doings. Once when I was angling, and standing quite still among the bushes by the side of a

* Communicated by the Rev. G. T. Rudd, M.A.

stream, a kingfisher came and settled on the bank close at my feet; and a near relative of my own, on a like occasion, had a kingfisher actually come and perch on his angle-rod. There is one habit of the kingfisher, which has often struck me: I mean the instinctive pleasure it seems to take in flying over water, and this, not in search of its prey only, which lives in that element, but, as it should seem, unnecessarily, and for the mere sake of doing so. I have repeatedly observed, that even when alarmed, and fleeing from the object of its fear, the bird will *go out of its way*, as I may say, in order to fly over the surface of water, rather than continue a straight course over dry land. There is a sequestered lane in this county, with which, in my youth, I was very familiar, and which afforded an excellent field for the exhibition of this propensity of the kingfisher. The lane was perfectly straight for a considerable distance, and on either side of it, there were at intervals, several narrow pits of water by the hedge-side, or one might call them broad ditches. These were the usual haunts of a kingfisher. On starting the bird, as I have very many times done, from one of these pits, I used to observe that it invariably flew over the water till it came to the end of the pit, then suddenly crossing the lane, almost at a right angle, it skimmed along over another pit on the opposite side, and then crossed back again to the side whence it started, for the sole purpose, as it should seem, of passing over the surface of another of these pits; for the bird, on these occasions, was not in the pursuit of prey, but alarmed at my approach, was hurrying away from supposed danger; and yet, instead of going off the shortest way, in a straight line, it would (as I have said) cross and re-cross the lane, apparently with no other object in view than the pleasure to be derived from travelling over water, rather than over dry land. Whether the kingfisher in any degree feels a sort of security when water is beneath it, or whether, on an emergency, it ever drops into it in order to escape a sudden danger, as the wild duck and some other water birds are known to do, is more than I will venture to say; but the fact above recorded, I have repeatedly witnessed. Probably it is this propensity of passing over water, added to its kestrel-like performances, that may have given rise to the fabled notion of the kingfisher's delighting to view its own reflection in the surface of that element.—*W. T. Bree; Allesley Rectory, near Coventry, January 18th, 1847.*

Occurrence of the Gray Phalarope (P. lobatus), near Chipping Norton.—Five individuals of this species have lately been seen in this neighbourhood, three of which were shot. I have two of them, one an old male, the other appears to be a young bird of the year; all were seen on the water during the late floods.—*Thomas Goatley, Chipping Norton.*

Occurrence of the Gray Phalarope at Wretham.—The keeper of W. Birch, Esq., of Wretham Hall, observed four phalaropes (probably gray) on the pond belonging to the farm at Fowl Mere, on the Wretham estate. They were swimming about quite tame with the ducks belonging to the farm. The keeper's mother, who lives at the farm, thought them snipes, and said they had been there for the last three weeks, and had become quite tame. She wished him not to shoot them. Soon after, he shot one (an immature gray phalarope), out of four, on a Mere close to Wretham Hall. Most likely these were the same as were observed on the pond, as they disappeared about the same time. The pond is close to the house and road.—*C. B. Hunter; Downham, Norfolk, January 6th, 1847.*

A tame Snipe.—It seems to be not generally known, that the common snipe (*Scolopax Gallinago*) is capable of being domesticated. Bewick, in his 'History of British Birds,' makes no allusion to the subject. In Yarrell's work, bearing the same title, it

is incidentally mentioned (vol. ii. p. 608), that "a snipe, slightly wounded in the pinion, which was kept in confinement for some time by Mr. Blyth, would eat nothing but earthworms." Whether any other naturalist has succeeded in preserving the animal alive, I am unable to say. On Friday, the 30th of October, while some men were out in the fields in this neighbourhood, amusing themselves with catching small birds with a fly-net, they secured a full-grown snipe, which came into my possession on the following day. The head was partially denuded of feathers, in consequence of the bird having struggled against the bars of a cage, through impatience at being confined. However, it made no effort to escape when held in the hand, and would even stand quietly on the knee, drink water out of a glass, and fish up worms from the bottom. I have now had this singular pet for more than two months, and, to all appearance, it is perfectly reconciled to its novel mode of life. During the late continuance of severe frost, there seemed every probability of its dying of hunger, as earthworms were not to be procured, and, like the specimen noticed by Mr. Yarrell, it at first refused to take any other kind of nourishment; however, necessity soon prevailed, inasmuch that the raw flesh of the hare and rabbit, together with tripe cut into narrow strips, have been taken into favour, but the ordinary kinds of butchers' meat are rejected. Earthworms remain decidedly the favourite article of diet, and of these it consumes a quart in three or four days. The habits of this creature are surprisingly familiar, considering its commonly supposed irreclaimable nature. During the night it reposes quietly in a cage, standing on one leg, with the head under the wing. By day, however, a desire to be enlarged is signified by an incessant striking of the bill and head against its prison wires. When released, it flies about the rooms and passages, walks on the table, is pleased at being noticed by those about it, and is on terms of great intimacy with a little spaniel lap-dog. No situation appears to accord so well with the animal's ideas of comfort as a place on a stool before the fire. Thus accommodated to its liking, and especially if at the same time fondled with the voice and hand, or enjoying the close proximity of its canine associate, it emits a subdued whistling note, sometimes, but very rarely, varied with an approach to a twitter. The food is usually given to it in a glass of water. Wherever the vessel is placed, all that is requisite to secure prompt attendance is to scrape against the edge with a metallic substance. In feeding, it has great difficulty in seizing a worm, or any substance of similar form, that may happen to be lying on a flat surface. After repeated unsuccessful attempts, the morsel is at last got lengthwise between the mandibles, and disappears. Strangers are readily distinguished from the people of the house, as shown by an evident difference of manner indicative of alarm, manifested in their presence. Should any one be too rude in his advances, the bird, in endeavouring to avoid him, has a peculiar way of erecting the tail feathers and turning them all in the opposite direction. It likes to be kept clean, and devotes frequent attention to the smooth and orderly arrangement of the plumage. Although, in the opinion, at least, of Milne-Edwards, the visage of the genus *Scolopax* bears the stamp of stupidity (leur aspect dénote la stupidité), some of the foregoing circumstances indicate the possession of as large a share of intelligence on the part of the present convert to civilisation, as most of the feathered race are capable of testifying by their actions to our apprehension. The specimen is now in the Earl of Derby's aviary at Knowsley.—*C. Cogswell, M.D.; Warrington, January 8th, 1847.*

Occurrence of the Scaup Duck near Godalming.—A fine specimen of the scaup duck (*Anas marila*) was shot on a large piece of water, close to Milford House, near

Godalming, Surrey, on the 8th of December, 1846.—*W. W. Spicer; Puttenham, January 27th, 1847.*

Ducks hatched in Trees.—I observed numerous wood-ducks (*Anas sponsa*) fly out of the trees: this beautiful bird often hatches in their tops, and conducts its young to the water in its bill.—*Featherstonhaugh's 'Canoe Voyage,'* ii. 209.

Occurrence of the Glaucous Gull at Ramsgate.—Whilst staying a few days at Ramsgate, I saw two examples of young glaucous gulls (*Larus Glaucus*), one of which I succeeded in shooting. The occurrence of this description of gull is by no means common in this part of the country.—*D. Henry Fry; The Willows, Upton, Essex, December 16th, 1846.*

Occurrence of the Little Auk near Downham.—Four specimens of the little auk have been picked up dead in the neighbourhood during December.—*C. B. Hunter, Downham, January 6th, 1847.*

Occurrence of the Little Auk near Durham.—"A fine specimen of the little auk (*Mergulus melanoleucos*) was shot on Monday last by Mr. Hunter, on the River Wear near Durham: it is a native of Iceland, and seldom quits its native haunts except when driven away by storms or severe weather: it has occasionally been met with on the coast, but this is only the second instance that it has been found so far inland."—*Newcastle Journal, December 5th, 1846.*

Occurrence of the Little Auk in the Moray Firth.—A numerous flock of these emigrants of the feathered tribe, from the Polar regions, made their appearance in the Moray Firth last week. Although they must have endured many buffeting storms during their long flight, yet they were by no means exhausted, as birds of their class are when driven far from the spot where they are bred. Every stream and burn falling into the frith was discovered to have some of the active little divers, and so careless were they of the presence of man, that in some instances they were taken alive, while others are said to have been found in the interior of houses. Wilson appears to have seen very few of them in America, yet his description is nearly as accurate as if taken from the specimens before us, which are about nine inches in length, and fourteen in extent of wings; the bill, the upper part of the head, back, wings, and tail, are black; upper part of the breast and round the back of the head dusky white (black in summer); the whole of the lower parts, and tips of the second wings, pure white, with several bars of the same colour on the back; legs inclining to brown, and above each eye a spot of white. The beak is short and powerful—somewhat similar to that of black game—and admirably adapted for breaking up small crabs and other Crustacea, its natural food, which abound in the frozen seas. About Davis's Straits and Greenland, the ice birds, as they name them, congregate in great flocks, often amusing the sailors in their dreary task of tracking their ships through the lanes of water, and sometimes flying against the ropes and rigging with such velocity as to fall down dead.—*Inverness Courier, December 16th, 1846.*

Occurrence of the Little Auk near Cromer.—I have just seen a specimen of the little auk (Yarrell's Birds, vol. iii. p. 358). It was picked up by the keeper in or near Felbrig Park, the seat of William Windham, Esq., on Saturday night last, greatly exhausted. Upon being taken into the house, and provided with a basin of salt water, it revived, and dipped and washed itself, but died in the course of the night. The singular small spot, of snowy whiteness, over the eye, was most distinctly developed. There was around the throat a band of dingy feathers, about an inch deep, evidently indicating a state of moult.—*S. Edward Fitch; Cromer, December 14th, 1846.*

Occurrence of the Stormy Petrel (Procellaria pelagica) near Chipping Norton.—Two of these birds have recently been brought to me, one of which was found dead, and in rather a high state; the other quite fresh, and in nice condition: it was whipped down by a boy while in the field at work. The late storms at sea have probably driven these birds away from their favourite element.—*Thomas Goatley; Chipping Norton.*

Occurrence of the Stormy Petrel near Knaresborough.—The high wind which has prevailed during the last few days brought over, on Wednesday last, to New York, in this neighbourhood, a fine specimen of the stormy petrel (*Thalissidroma pelagica*). It was so far exhausted as to allow a person to take it up in his hand, and when brought to me was but just alive, and died shortly afterwards.—*James C. Garth, Knaresborough, October 26th, 1846.*

Occurrence of the Stormy Petrel at Halifax.—“Last week a stormy petrel was picked up in Broad Street, Halifax, in a very exhausted state: it remained alive until evening; and had, no doubt, been driven so far inland by the recent stormy weather.”—*Illustrated London News.*

Anecdote of Sagacity in Frogs.—During one of those wet evenings in the beginning of October, my attention was directed to a noise between the window and the shutter-blind (or sun-blind) of the sitting-room of the house I was stopping at, in the quiet village of Lindfield, in Sussex. I looked, but could not see what caused the noise: presently the same noise occurred again; and on looking a second time, I found it proceeded from a fine frog climbing up the blind, and then jumping down again. I took no particular notice of it, thinking the frog was taking shelter from the storm; but presently a second one made its appearance, acting in the same way as the first one. Their actions in this way lasted for some time; they then changed their mode of climbing, and instead of having their backs to the inside of the room, turned about and climbed up the window-frame, and looked into the room, jumping down to one particular spot. Fancying they were attracted by the light, I took no further notice, than occasionally looking at them, and retired to rest, leaving them in their snug retreat, as I thought, for the night, but what was my surprise when in opening the shutter or sun-blind, the following morning, to find that a fine large frog had been caught by the leg, and made a prisoner between the blind and the window. From this, I think it not at all unreasonable to presume that our visitors, the evening before, had been drawn to the spot by the cries of their captured brother; and their climbing up the blind, and especially the window, and looking into the room, was for the purpose of imploring assistance to effect the escape of the imprisoned one. What makes it still more striking, is, that when they jumped down from the blinds they always jumped to the spot where the captive was. I have often heard of instances of sagacity in dogs, horses, and even pigs, but never heard of it in frogs before.—*Robert Davis; Belgrave Place, Pimlico.*

Notes on the Fishes of the District of the Land's End.

By R. Q. COUCH, Esq., M.R.C.S.L., &c.

THE Pilchard, *Clupea pilchardus*. That portion of the history of this fish which may be considered general, as well as the modes by which it is captured on the Cornish shores, have been so fully described in Yarrell's 'British Fishes,' and in several Papers in the 'Transactions of the Royal Cornwall Polytechnic Society,' that they hardly need be more than alluded to again. Our chief attention will be directed to its habits and migrations, as exhibited within our prescribed limits. This western portion of Cornwall must be considered as the chief seat of the pilchard fishery, and St. Ives as the head quarters. From the number of men engaged in the pursuit, and from the locality being very favourable for observations, the migrations can be more carefully watched than in any other part of the county. Deriving my information from the persons engaged in the fishery, and daily noting the exact spots in which the fish were taken, their course has been tolerably clearly ascertained. These notes, however, extend over the three years of 1844, 1845 and 1846. On a review of these records, I think there can be no doubt that the pilchard remains on some part of the Cornish shores throughout the year, and that it does not perform those extensive migrations formerly thought to have occurred. I have seen pilchards taken from the stomach of the hake, cod, and other predaceous fishes, during the winter and spring, and have seen them taken in the mackerel-nets in the spring and summer, on the western fishing-grounds, including Mount's Bay; and as the fishery is an autumnal one, their presence throughout the year is very clearly ascertained. In the spring mackerel-nets they are repeatedly taken; and early in summer small flocks or "*schulls*" are frequently seen sporting at the surface of the water. Towards the latter part of summer the regular fishery begins, and it is continued till late in the autumn on the southern shores; and at St. Ives, on the northern coast, large catches are annually made about October and November, and sometimes in December. They are most rarely seen during the latter part of winter, and very early in spring; then they are in deep water, on the south-western parts of Cornwall, and at the entrance to the English Channel, and to the south and west of the Scilly Islands. At this time they swim deep, rising in proportion to the fineness of the weather, and their course is generally in a westerly direction, being most commonly taken on the

eastern side of the nets. If the weather continues fine for some days, they are occasionally found irregularly to approach the shores in sandy situations, as at Mount's Bay, Lamorna Cove and Whitsand Bay, and also near St. Ives; but they rarely at this time congregate into large masses, and frequently a few stragglers only are to be seen. During the early part of summer, and late in the spring, such as about April, May and June, they are occasionally seen in small shoals, but without any definite course; sometimes going east, at others west; sometimes approaching the shores, and at others returning into deep water off the land. When the other fisheries have failed, advantage is taken of this, their early appearance, and the boats go in pursuit of them. In 1842, on the 23rd and 28th of April, ten hogsheads were taken in Mount's Bay; and in 1843, on the 30th of November, upwards of a thousand hogsheads were taken in Mount's Bay by the drift-nets. In former years their early appearance was more frequent than it has lately been; thus about the year 1790, shoals of the pilchard were frequently seen about January and February. But even when they are not seen, if the nets are "shot" off the sandy inlets about sun-set, many will be frequently taken, but what seems strange, is, that they are all meshed on the shore side, and if taken in the morning, on the outside of the net. From this it appears that they approach the shore during the day, and return to deeper water towards evening. Such is the opinion of the fishermen, and such I believe, from their catches, to be the case. These diurnal migrations occur when the fish are supposed to be not yet arrived on our shores. As summer advances, the stragglers associate into small companies; these again unite into larger ones, called "*shirmers*" or "*braking-schulls*;" and finally into those large autumnal schulls which are the objects of the fishery. In the early spring they can hardly be said to be gregarious, for they move independently of each other, in a very irregular manner. When they begin to congregate, they rise to the surface, and though they move about without any apparent order, yet their general course is in a westerly direction; and this is ascertained by the side of the nets on which they are taken, and by the boats following the direction of their course. The great bulk of the fish, however, do not remain close to the shores throughout the year, but in deep water; and in their annual migrations they resort to the south-west, west and north-west of the Scilly Islands, and the entrances to the channels. Late in July, or early in August, the boats of Mount's Bay return from the coasts of Ireland, where they have been engaged on the herring fishery, and then they fall in with immense shoals of pilchards at the

entrance to the St. George's Channel, and to the south and at the entrance to the English Channel. This I have had repeatedly confirmed by the masters of the vessels employed in the Welch coal-trade. Some of the fishing boats, which returned from Ireland in the second week of July, in 1846, found the shoals small, and much to the south of their usual position, but they were going in a northerly direction; those boats, however, which returned at their usual time, the first week in August, found them on the same spot, and in the same sized schulls as in former years, but with a southerly course. As this evidence is confirmed year after year, it may safely be supposed, that early in spring and summer they retire into deep water, and gradually congregate at the entrance to the English and St. George's Channels, till the period of their migrations towards the land. While this may be remarked on the great bulk of the summer fish, yet there is good reason to believe all do not retire so far to the west, for good catches are sometimes made in June and July, to the south-west of Mount's Bay, and to the south of the Lizard. But as you advance eastward they become more and more scarce. About Mevagissey, Fowey, Polperro and Looe, catches are made in June and July, but it is not till August and September that the great catches are expected, and then the boats go west to meet the shoals as they advance eastward.

The chief resort of the pilchard, therefore, so far as I have yet ascertained, during the period of its congregating, is to the west of the Scilly Islands, extending to the north, and occasionally the circumference of the shoals extends to near the Welch and Irish shores, and eastward, along the western shores of Cornwall, in deep water. But the united testimony of all our men engaged in the Irish herring fishery, is, that they never saw a pilchard to the north of the Small's lighthouse on the Welch shores, or of a line extending from that spot to Waterford, in Ireland. As they are engaged in the herring fishery, and that is carried on in precisely the same manner as the drift-net fishery for the pilchard, their never having taken one pilchard to the north of that line is worthy of especial notice. A better test of their presence could not be devised, as the same nets are used in many instances on both occasions. Further observations, however, are required before this can be assigned as their northern limit; they may wander further after the boats have left the shores, for at that time their course is frequently in that direction. One thing, however, is certain, that they cannot go much beyond it, as the period of their appearance on the Cornish shores takes place within a fortnight from that time. To the south of this line, their chief resort is on the

Cornish side of the Channel,—from off St. Ives to the Land's End. The "schull" or "schulls," when they begin their great annual movement, pass southward, and a portion strikes the land to the north of Cape Cornwall, and turns in a north-easterly direction towards St. Ives, and constitutes their summer fishery, which in that district is the smallest. The great bulk passes between the Scilly Islands and the main land, through that sheet of water called the Lionese, like an immense army, extending itself parallel to the land. To look from Cape Cornwall, or from any of the highlands of St. Just, and see this immense moving mass extending as far as the eye can reach, approaching the shores and reddening the waters, is a sight of great interest and beauty, and such an one as would repay any exertion to witness it;—they approach, and

"Forthwith the sounds and seas, each creek and bay
With fry innumerable swarm, and shoals
Of fish, that with their fins and shining scales
Glide under the green wave in schulls that oft
Bank the mid sea."

In most of the sandy bays in their passage, seines are established for their capture. In some seasons they approach so near, that their course corresponds with the indentations of the shores. They will take, for instance, the sweep of Whitsand Bay, and pass between Cowloe and Pedn-mean-du, and between the Longships light-house and the Land's End; then close to Tol-pedn-penwith and Pedn-mean-annear, and from thence into Mount's Bay. Sometimes they pass into the bay, and at others cross over towards the Lizard. During this part of the fishery the boats of Mount's Bay go to the westward, and get a clear offing to the north-west, so that the fish may come uninterruptedly to their nets, the meshing always occurring from that direction. After this their progress is eastward; but it depends on the state of the tide whether they shall cross to the Lizard, or take the sweep of Mount's Bay. If they strike the Lizard, they turn in by the land, and are taken at Mullion. If they pass beyond the Lizard, they go on to Mevagissey, Fowey, Polperro, Looe, and the other points of the fishery. During the last season, after the fish had passed Tol-pedn-penwith, they disappeared; but on the fourth day after it blew smartly from the south-west, when the fish struck the shore near Marazion Green and St. Michael's Mount, and there they were taken by the seines. At another time they disappeared at the same point, and in three days were observed at Mullion, on the eastern side of the bay. If they are taken by the drift-nets, out in the bay, their course is eastward; if near the

shore, it is westward ; which can only be accounted for by the currents, which are then setting in the same direction. So that if the fish touch the shore to the west of the Lizard, they afterwards sweep in and return to the west. Of late they have not gone so far eastward as in former years, and though the great "schull" is as large as formerly, or very nearly so, yet the fish that pass up our southern shores have greatly decreased, if the quantities taken be an index to the quantity existing. This, however, I rather think is not the case, for the quantity taken depends more on the direction the fish take : if they pass up in deep water, they escape the seines, and in some measure the drift-nets ; and if they swim low, they escape altogether, and the fishery is a failure. The season of 1845 was not by any means a good one, yet the quantity of fish that passed round the Land's End was as great as ever : in 1846, they passed much nearer the shores, and in the eastern fishing-grounds the quantity taken was unusually great. When the fish prefer deep water the fishery is very partial and uncertain, for they will move in the usual mass, for days together, with very little variation ; and then, as if actuated by one impulse, will suddenly approach close to the shores, so that the different stations may be more or less successful from this cause alone. What the cause of these movements is, is not yet ascertained. The function of spawning no doubt exercises great influence, and the state of the weather produces some effect ; the currents of particular localities may and do determine local directions, yet the grand movements of the mass must be determined by other and more universal causes. Sometimes the fish are in pursuit of food, and when the fishermen find their nets covered with "sea-lice" (*Entomostraca*), they always expect large catches. But the shoals appear sometimes to be merely sportive, and at others pass along the shores with great rapidity, as if in search of a given object. The cause of their migrations is at present unknown ; and what can limit their wanderings from the "Smalls" on the north, to the Cornish shores, to the Start Point and Bigbury Bay, in Devonshire, on the east, cannot even be surmised. The same food, the same water, the same temperature and shores, equally varied with those marking the line of their migrations, are to be found widely extended beyond those limits. Diligent and long-continued observations may eventually elucidate this obscure point in their history, but at present we must remain contented with the facts.

(To be continued).

Singular Disease in Sticklebacks.—A pond in the outskirts of Liverpool abounds with sticklebacks (*Gasterosteus leiurus*), numbers of which are diseased in a remarkable manner, having large globular excrescences, filled with a pure white fluid, protruding from various parts of their bodies; sometimes to such an extent that jointly they equal in bulk the fish itself, and are singly as large as a pepper-corn. That they are not foreign matters adhering to the skin is obvious without dissection, those on the back and sides showing the markings and colours of the fish, only lighter (from distension, and the transparency showing the fluid through); those on the belly are silvery white. The diseased fish are all small and ill-conditioned. I kept some alive in a glass vessel for some time; they were very lively, and would eat small pieces of the bodies of flies, &c., taking them fearlessly from my finger. The disease is not peculiar to this year. I have a specimen in spirits, which I obtained in the same pond three or four years ago. In a ditch about two hundred yards from the pond the sticklebacks are quite healthy.—*George Wolley*; 9, *Cambridge Street, Liverpool, Nov. 13th, 1846.*

Capture of large Sturgeons in the Usk, near Bridgewater.—As an accompaniment to the notices in the 'Zoologist' (Zool. 1419 and 1555), on the capture of "a huge sturgeon in the Wye," and "a large sturgeon in the Usk," I solicit a place in this highly interesting Journal for an account of the capture of sturgeons in the river Parret, near Bridgewater. In the middle of May, 1829, one was taken about five miles below Bridgewater, and brought alive to the town, which weighed 273 lbs. I procured the roe, which weighed 40 lbs., and I reckoned the number of ova by counting those of some half-ounces and ounces, and found them to amount to 1,920,000. L^{ew}-en^hœck is reported, in popular books, to have discovered in a fish of this species 150,000,000,000 ova: this number is so enormous that I suspect it is improperly printed. In the middle of May, 1839, another large sturgeon was taken in the Parret, a mile below the town, which weighed 250 lbs.: the length of this fish was nearly nine feet. Other large sturgeons, not so large as the two mentioned, have since occurred in our river, and small ones two or three feet long are not uncommon here. The creatures which serve this fish for food must be small; the structure of the mouth and alimentary canal will not allow it to feed on large substances: I have found in the stomach only elvers and different species of shrimps, and I have examined very large specimens. Large sturgeons have been taken in the Parret, within the last forty years at least, only in the month of May, thus agreeing, in the time of their visit to our river, with the periods of captures in the Wye and the Usk, as recorded (Zool. 1555) by Mr. Bladon. This is what would be expected, on considering the vicinity of the mouths of the Severn and Parret, at the head of the Bristol Channel.—*Wm. Baker*; *Bridgewater, February 8th, 1847.*

Habits of the Trout in Lake Huron.—"A Mr. Biddle related to me a curious fact respecting the large trout of the lake. Upon one occasion he caught one weighing 72 lbs., which, when it was drawn up, had a large white fish (*Coregonus albus*) in its throat, with its tail sticking out of the trout's mouth, whilst inside of the salmon were two more white fish, each weighing about 10 lbs.: both of these fishes were lying with their heads downwards, and in this manner he had invariably found them when inside of a salmon-trout. The voracity of this animal must be great, if, not satisfied with three large fishes, he must dash also at the bait of the angler. Propensities of this kind sometimes lead others, who are not fishes, a little too far. An Indian, who was a very experienced fisherman, explained to my informant the probable reason why the white fish are found with their heads downwards. He said he had frequently seen

from his canoe, when in still water, the salmon-trout chase the white fish; and that whenever they perceived he was near them, they invariably turned round as if to look their danger in the face, and making no resistance, were taken head foremost into the jaws of the enemy. A curious provision of Nature, unnerving the weak to feed the strong. In the winter season the Indians cut holes in the ice where it is transparent, and contrive to drag their nets beneath it. They also spear the trout, using upon such occasions a painted fish as a decoy, which attracts the minnows. The voracious trout, perceiving that something is going on, now gets in motion, and the minnows, aware of his approach by the movement of the water, run off in a contrary direction; which apprising the Indian of the quarter from whence he is making his approach, he adjusts his spear, and transfixes him as he comes up. These large trout look very much like cod-fish; but in their huge gaping mouths are rows of excessively sharp teeth, indicative of their voracious nature. The white fish is a sucker, and is not, I think, as pleasant to eat as the trout. This last fish is very firm, and but faintly resembles the salmon, both in colour and flavour; neither is it as rich, but it is very good, and is a blessed sight to set before a hungry traveller. The white fish, however, is preferred by the inhabitants of Michilimackinac, who almost live upon it when it is in season."—*Featherstonhaugh's 'Canoe Voyage up the Minnaw Sotor,'* i. 144.

Deadly encounter between two Salmon.—Instances of the ferocity of the varied species of bipeds and quadrupeds have been often recorded in the public journals, and Mr. Jesse and Mr. St. John have lately furnished interesting incidents regarding the traits and habits of these animals; but we have this week to narrate a more remarkable occurrence, in the character of the salmon, than we have yet had the opportunity to record. The facts are these: while several cuttermen (of the Preventive Service) were on their rounds the other day, and bearing along the Findhorn, between Glenferness and Dulcie Bridge, they observed an unusual commotion among the spawning-beds of the ford. On approaching the spot two large male salmon were seen engaged in mortal combat for the possession of a female. Never did chivalric knights contest for the hand of "ladye fair" more fiercely than those buirdly "lords of the flood." The tranquil bosom of the stream was lashed into foam by the struggles of the finny antagonists; in the meantime the object of the fray beating silently about, "spectatress of the fight." From the appearance of the stream—dyed with blood, and gradually assuming its former smooth surface—it was evident that the contest was over. One of the salmon, at last, flounders on the surface—dead, and the victor, it may be conjectured, exhaustedly bore off his prize. The men, who had the curiosity to watch the fight, as a proof of their story, conveyed the dead salmon to the nearest dwelling, that of Mr. George Mackintosh, March Strype, near the entrance of the secluded valley called the Streens. The victorious salmon had torn off the flesh, or rather fish, along the back from head to tail, to the very bone. In the movement of salmon spawning, the males have often been seen chasing one another, but such a fray as this has not been witnessed by the oldest fisher or poacher on the Findhorn.—*Elgin Courier*.

Occurrence of Bulimus Lackhamensis and Dreissena polymorpha near Cheltenham.—

There are three localities for *Bulimus Lackhamensis* near Cheltenham: Cranham wood, where last year I collected between seventy and eighty specimens; Halling wood; and beech trees on the north side of Lineover Hill. On the submerged timbers of the third canal bridge from Gloucester, *Dreissena polymorpha* is found most abundantly: I also noticed it, three years ago, on timber in the Ouse, near St. Neots', Huntingdonshire, which shows that this foreign shell will probably one day become as plentiful, in our navigable rivers and canals, as that veritable native *Anodon Cygneus*.—*Charles Prentice*; 1, *Oxford Villas, Cheltenham*.

Enquiry respecting Gossamer-webs.—Would you have the kindness to explain to me the cause of the gossamer-webs which are floating about in the air, and covering the fields, and also the reason of their being found only in a frosty atmosphere? Is it possible that they can be the work of spiders?—*Henry Shepherd*; *North Wales, Winchester, October 27th, 1846*.

[So much has been written on this subject, and with so little advantage to the enquirer, that I prefer referring my correspondent to Nature herself: the webs are undoubtedly the product of spiders, but their great elevation has never been satisfactorily explained.—*E. Newman*.]

Habits of a minute Spider.—Whilst walking on the South Downs, between the villages of Piddinghoe and Rottingdean, in Sussex, I observed, on several branches of gorse, that the extreme ends of the branches were covered with a thick web. This web was studded with myriads of small scarlet spots, which, on closer examination, proved to be insects in constant motion. I broke off a small branch, and placed it in a tin collecting-box, to the sides of which the insects had, in a few hours, attached the branch, by means of their web. On my return home, I transferred them, with the piece of gorse, into a glass tumbler, in order to be able to watch their operations. In the course of the two following days, they had fixed the branch to the sides of the glass, and had filled the interior of the tumbler three parts full of web. The glass was placed on a warm mantelpiece, about two yards from a south window, and the insects principally carried on their operations on that side of the glass nearest the light. The web was not very firmly attached to the glass, as a breath of air would displace it. The height of the web increased most on the side of the glass facing the window, and on turning the glass half round they gradually congregated on the opposite side, leaving the seat of their former work for a situation nearer the light. During the day-time, most of the insects were moving about at the sides of the glass, or on the top of the web; but at night they retired under the web, or between the web and the sides of the glass, and were generally congregated rather thickly at that side of the tumbler where they were last at work. Their operations were suspended soon after sunset, and commenced again an hour after sunrise. At night, the presence of a strong light produced no sensible effect on them. On the third day, I observed on the sides of the glass, and near the bottom, several small scarlet spots, about half the size of the insects. Could this have been their excrement? The following is a description of one of the specimens:—body irregularly oval, breadth and thickness being each equal to about half the length; colour scarlet or pale blood-red, the head and legs being rather paler than the other parts: abdomen with three (perhaps four) darker blood-red, trans-

verse, broad bands across the back, where there were ten to twelve single hairs: legs eight, fringed with hairs: hairs quite white, and most numerous at the feet, where four or five were in a cluster. Down the centre of the back was a plain disc, equal to one-fifth of the greatest breadth, bounded on each side by a longitudinal row of hairs, and on the spaces on either side were a few solitary hairs placed irregularly. Length $\frac{1}{30}$ th to $\frac{1}{60}$ th of an inch. It required seven of them placed lengthwise to reach one-eighth of an inch. The insect, when irritated, assumed a much darker colour, and the transverse bands were then scarcely distinguishable. They were found about noon, on the 8th of February, 1844, and there had been a sharp frost in the morning: the sky was cloudy, and there was a fresh sea breeze. Thermometer 36 to 38. Wind S.W.—W. Thomson, Jun.

Occurrence of Argynnis Lathonia near Norwich.—Two good specimens of Argynnis Lathonia have been taken, and others seen, at Harleston near this place.—Charles Muskett; Norwich, October 9th, 1846.

Assemblage of Cynthia Cardui.—Perceiving in the last number of your very valuable and interesting work, the Zoologist, a paper soliciting that any interesting or remarkable facts, which may have fallen under observation, might be forwarded to you, I beg leave to mention a circumstance connected with the Cynthia Cardui, which lately fell under my notice. In an entomological excursion from Croydon, over the Addington Hills, I noticed in a small clump of elm trees, on the right hand side of the road, about mid-way up the hill, great numbers of this butterfly (some fifty or sixty) flying or flitting about in all directions, yet not going out of this group of trees, even when disturbed. I obtained thirty-six of them, mostly much rubbed, but a few in excellent condition. Also, in another clump of trees adjacent, in which, singularly enough, were the Vanessa Atalanta, in equally great numbers, of which, also, I obtained a great quantity. Now it is curious that the Cynthia should be found in such numbers, as I believe they generally are considered somewhat rare, and particularly in a place not containing a vestige of their food, and all concentrated in one little spot, and not to be found in any other place, although many similar in appearance are near.—Charles H. Griffith, 9, St. John's Square, London.

Capture of the Vanessa Antiopa, at Stoke Newington.—I write to inform you of the capture of a Vanessa Antiopa, in Lordship Lane, Stoke Newington, on Friday afternoon, last. I have just received it, but in a damaged condition, owing to the person taking it not being an entomologist.—Thomas Hall; 7, City Road, 16th Nov. 1846.

Capture of Vanessa Antiopa, near Bristol.—I have the pleasure of recording the capture of V. Antiopa, in this neighbourhood, on the 22nd of last month; the insect was flying pretty swiftly in the sunshine, and was knocked down by a boy, and slightly injured. I am happy to add, that it is now in my cabinet.—Thomas Lighton; Clifton, Bristol, October 26th, 1846.

Occurrence of Vanessa Antiopa, near Ely.—On the 7th of September last, a specimen of Vanessa Antiopa (now in my possession) was taken in a garden at Mepal, about six miles west of Ely. The margin of the wings is of a very pale colour. Mr. Doubleday states that a female was taken at Yaxley; if Yaxley in Huntingdonshire is meant, the distance is not more than eighteen miles north-west of Mepal.—Marshall Fisher; St. Mary's, Ely, 15th October, 1846.

Occurrence of Vanessa Antiopa, near Coventry.—To the numerous notices already recorded in a late number of the Zoologist, of the occurrence of *Vanessa Antiopa* during the last summer, I have to add the capture of this fine insect, in the adjoining parish of Berkswell. The butterfly was taken about the middle of August, by a sort of bird-catching person, who collects a few of the more showy insects, for the purpose of adorning his bird-cases, and was not recognised by him as a rarity, nor valued so much as the admirals and peacocks he caught for the same purpose. The specimen, which has lost a little of its original brilliancy, is now in the possession of my son.—*W. T. Bree ; Allesley Rectory, near Coventry, January 18th, 1847.*

Note on the capture of Deilephila Livornica, near Preston and Carlisle.—I am in possession of two specimens of this rare moth, one of which was taken in this town, and the other near Carlisle. I have also heard of another having been taken in the west of Cumberland, and which is now in the possession of a gentleman in York.—*James Cooper ; Preston, October, 1846.*

Capture of Deilephila Celerio, in Norfolk.—A specimen of this insect was taken off a door on the Church Plain.—*George Fitt, Jun.*

Capture of Deilephila Celerio, at Seaford, in Sussex.—A specimen of this rare Sphinx, a female, in pretty good condition, was taken, the first week in October, at Seaford, Sussex, and is now in my possession. It flew into the kitchen of a house there, about 5 o'clock in the afternoon, and a lady, who has since given it me, having had her attention directed to it, caught it in her hand. The struggle it made to escape, slightly broke and rubbed the tips of the upper wings, and also damaged the thorax ; in other respects, it is a fine, perfect specimen.—*Thomas Ingall ; Bank of England.*

Capture of Deilephila Celerio, near Ledbury.—As you are desirous, I believe of recording in the Zoologist, the captures of rare insects, I have to inform you that a specimen of the silver-striped hawk moth (*Deilephila Celerio*) is now in my possession, having been kindly presented to me by the Rev. J. H. Mapleton, who took it in his stable, in the village of Tarrington, near Ledbury, in the summer of 1845 ; he believes, but is not quite sure, that it was in the month of August. From the appearance of the specimen, I should judge that it had very recently come out of the chrysalis.—*W. T. Bree ; Allesley Rectory, December 22nd.*

Capture of Deilephila Celerio at Huddersfield.—A very fine specimen of the *Deilephila Celerio* was taken at Huddersfield, in September last. It flew into a small public-house, in the precincts of the town, and was fortunately captured without receiving much injury. Several specimens of the Sphinx *Convolvuli* have likewise occurred in the same locality.—*Peter Inchbald ; Storthes Hall, Huddersfield.*

Capture of Sphinx Convolvuli, at Yarmouth.—These insects have been taken in immense quantities in Yarmouth, during the past summer and autumn, not less than one hundred and fifty were captured. One person, within my knowledge, has taken fifty-seven, and others have captured a great many. One which I now have, was taken off a ladder. A person told me he saw a flight of them on "Caistor Marrams," which would seem to confirm our opinion, that they migrated from the continent. Another reason for supposing them to be migratory, is, that no person has yet succeeded in finding the larvæ.—*George Fitt, Jun.*

Larva of Sphinx Convolvuli.—About two weeks ago, I had brought to me, a caterpillar, which I supposed to be that of *Sphinx Convolvuli* ; it agreed with the description of the larva of that insect, in Stephen's British Entomology, being of a dark olive green colour, with dark yellow oblique lateral stripes, and was rather larger than the

caterpillar of *S. Ligustri*. The person who found it, stated she got it out of the ground, but when put into the breeding-cage, it refused to bury itself, or eat, and died in the course of a short time. I see the end of July is the earliest period for the appearance of the perfect insect, mentioned in the *Zoologist* for this month, and I imagine this caterpillar must have been produced from eggs, laid at, or previously to that time.—*A. Greenwood* ; *Chelmsford, November 3rd, 1846.*

[*I particular request information about the larva of Sphinx Convolvuli*: it is almost, if not entirely, unknown to British Entomologists.—*E. Newman*].

Occurrence of Sphinx Convolvuli, and Acherontia Atropos, near Ipswich.—Having observed in the *Zoologist*, some accounts of very rare insects, I thought the following might not be wholly void of interest. I have obtained a specimen of the death's-head moth (*Acherontia Atropos*), which was caught at Aldbro', and which was kept alive several days on some potatoes, on which the caterpillar of this insect feeds. I have also received two specimens of the convolvulus hawk moth (*Sphinx Convolvuli*), the first of which, was found on removing some leaves of deal: the latter was brought me October the 9th, by a poor woman, into whose house it had flown. Both these last specimens were caught in Ipswich. I write this, because, not having observed in the *Zoologist*, an account of these insects from that locality, I thought it might be worth inserting.—*R. J. Ransome* ; *Ipswich, November 25th, 1846.*

Capture of Sphinx Convolvuli, in the Isle of Wight.—Having read in the *Zoologist* for September, accounts of the capture of this rare moth, I forward you an account of a capture I made last September. I was spending a few days at Sea View, near Ryde, Isle of Wight, and in the garden belonging to the house, there were several patches of a species of *Oenothera*, with very large white blossoms, growing close to the ground, these blossoms appeared to attract them very much (for I did not see them hover over any other plant in the garden). In one evening, I saw five or six over it, but captured two only. I visited the spot every evening, and although I saw several more, I was not fortunate enough to take any; but I took another specimen in the day-time, while at rest at the foot of a fir-tree, amongst the grass, my attention being drawn to it by some children, who ran to inform me, that there was a "large bat lying under a tree," this was an extraordinary large specimen, measuring five inches and nearly one-eighth from tip to tip of the wings.—*Robert Davis* ; *Belgrave Place, Pimlico.*

Capture of Sphinx Convolvuli, near Bristol.—On the 28th of August, I had a specimen of this fine insect brought me, which had been captured on a wall, and on the 31st of the same month another specimen was brought me, taken among beans; and on the 10th of September, I had the pleasure of capturing one myself, hovering over *Salvias*; and on the 12th, another on *Petunias*. About twenty other specimens were taken by collectors in the immediate neighbourhood.—*P. H. Vaughan* ; *Redland, near Bristol.*

Occurrence of Acherontia Atropos near Bristol.—On the 12th of October I bred a female specimen of this insect from a larva that I found beneath an ash tree on Durdham Downs, on the 24th of July; it changed to pupa on the 1st of August. A specimen of the larva was also taken at Henbury near Bristol, but unfortunately it died before it arrived at maturity.—*Id.*

Capture of Sphinx Convolvuli near Maidstone.—Three specimens of this insect were caught at Beuming, near Maidstone, between the 20th of August and the 6th of September last; one was captured over a plant of the *Marvel of Peru*, and the two others were found in the day-time, in a pickle-jar on a shelf, which most probably had had sugar in it.—*E. M. Attwood.*

Occurrence of Sphinx Convolvuli near Ely.—On the 17th of August last I saw a fine specimen of *Sphinx Convolvuli* taken on board a vessel a few miles off Yarmouth. About the same time this insect was, I believe, rather common at Ely. One individual has five or six specimens; another has two, and I have been informed that several more were seen.—*Marshall Fisher; St. Mary's, Ely, October 15th, 1846.*

Note on Clisiocampa castrensis.—I could not meet with a single larva of this insect this year, in a locality (Isle of Sheppey) where, in some years, hundreds could be collected. It is a very difficult insect to breed if the larvæ are obtained very young, and even when taken full-fed they frequently die after having spun up.—*Thomas Ingall; Bank of England.*

Observations tending to establish a new British Species of the Genus Lasiocampa.—From repeated conversation which I have had with my friend, the well-known naturalist, Mr. Weaver, and from careful investigation of all the facts and circumstances stated by him, little doubt exists in my mind, that, under the common designation of *Lasiocampa Quercûs*, two perfectly distinct species of British Egger have been confounded by entomologists. I have minutely examined, through a powerful microscope, the antennæ of both the common species, and of that which Mr. Weaver is seeking to establish as new; and can, consequently, vouch for the correctness of his observations respecting the peculiarities of structure of that important organ, which tend so powerfully to corroborate Mr. Weaver's views. I shall now content myself with transcribing, in the simple but lucid and expressive language of Mr. Weaver, the facts and observations upon which his opinions are founded, and conclude by a retrospect of the more striking peculiarities of structure and habit by which the two insects are characterized. The following is Mr. Weaver's statement:—

“Entomologizing on Rannock-moors, in the county of Perth, in June, 1845, I had the good fortune to capture ten specimens of this noble moth,—eight males and two females, flying at mid-day. Their flight is so high and rapid that it is very difficult to capture them. I took, also, at the same date, in the dusk of evening, a very fine specimen of the female.

“In June, 1844, on Rannock-moors, I found a caterpillar, of which I had not before seen the like, and, therefore, it was the more interesting to me. By diligently searching over the moors, on a misty day, I found others, of the same kind, feeding on the heath plant, which in September formed their cocoon. In June, 1845, I found more caterpillars, of the same species, on the heath, and those also changed into the chrysalis in September. And, again, in June and July, 1846, I took a few more of the caterpillar on the heath, which changed in September; and these I now have in the chrysalis state. I have given my best attention to all the changes of this interesting species for the last three years, and the result is, that I find all the circumstances precisely the same in each year.

“The larva, whilst young, feeds on the birch (*Betula*), willow (*Salix*), and heath (*Calluna*—formerly *Erica*—*vulgaris*). It comes out from the egg in July, and is adorned with a row of small gray spots on the back, which increase in size as the caterpillar grows, till the spots appear as large as common peas. These spots are not in the skin, but consist of light gray-coloured hairs, the rest of the hairs being of a dark chesnut colour, and so contrasting with the light gray before mentioned. But at the end of twelve months the caterpillar changes into its last skin, and the spots, at the same time, entirely disappear. It then might be mistaken for the caterpillar of another species, if its size and season of the year were not regarded, and also the long period

of fifteen months which it had passed in the caterpillar state. Forming its cocoon in September, it lies, through the winter, in this state. Therefore the species requires two full years for its progress through all its various changes; whereas all the other British species of the genus *Lasiocampa* pass usually through these changes in twelve months."

1. *Lasiocampa Quercus*, according to Donovan (British Insects, iii. 83—85), appears, in the winged state, in June,—according to Mr. Westwood in August. The female deposits her ova in June or July; the caterpillar is hatched in autumn, and remains, during the winter, in this state. It feeds on *Quercus robur*, *Prunus spinosa*, *Cratægus oxyacantha*, and divers herbaceous plants. All the successive skins assumed by the animal in this state exhibit, from first to last, the same general colours and markings. In the middle of May it spins a cocoon of a dull dirty straw colour, and the perfect insect comes out in June or July, so that one year only is occupied in its progress from the ovum to the imago state. The antenna of the male is very strongly and distinctly pectinated, and consists of sixty-four minute articulated pieces, the joints of which are nearly hidden by fine hairs, and measures, on the average, three-eighths of an inch in length. The size of the insect is generally smaller, and the colouring of the body, wings and antennæ less deep and rich, than those of the species about to be described.

2. *Lasiocampa Callunæ*. The perfect insect appears in June. The precise period of deposition of the ova is unknown. The caterpillar is bred in July, and passes through the first winter in that condition. *Calluna vulgaris* constitutes its principal food. On every succeeding skin, except the last, the hairs investing it are so coloured as to represent a series of circular ash-gray spots, arranged along the dorsal region of the caterpillar, and increasing in size as the animal grows. From the last skin these spots wholly disappear, and it then resembles, in colour and markings, the caterpillar of the common species, and may be readily confounded with it by those who have had no opportunity of observing the caterpillar in the successive stages of its development. It passes into chrysalis invariably in September, and goes through the ensuing winter and spring in that state, the cocoon being of a deep muddy-brown colour, so that two entire years are consumed in the process of evolution. The antenna of the male is more closely and delicately pectinated than in the preceding species; it consists of eighty-four pieces, not concealed by fine hairs, and measures full half an inch in length. The antenna of the female is also stronger and longer than in the female of *L. Quercus*. The size of the insect is larger, and the prevailing colours deeper, than in the first species; and a rich glossy puce, not seen in that insect, is exhibited on the wings of both sexes.

It may, perhaps, be objected that *L. Quercus* sometimes passes a second winter in chrysalis: this, however, constitutes the exception, not the rule. The same phenomenon has occasionally been observed in our new species, and two—and even three—winters have elapsed ere the insect has emerged from its cocoon. Size and colour, it may, again, be argued, are very uncertain characters for the discrimination of species. Taken by themselves they are certainly fallacious, but acquire considerable value when invariably connected, as in the present instance, with other more solid and important differences of structure and of habit. And I may fearlessly affirm, that many species in the Animal Kingdom, universally acknowledged as distinct by zoologists, are founded upon characters far less strongly marked and invariable than those distinguishing *Lasiocampa Quercus* from the new species which Mr. Weaver has had the

honour first clearly to identify, and which he has kindly deputed me the pleasant task of thus imperfectly introducing to the scientific world. It is gratifying to add, that the opinions of Mr. Weaver and myself, on this interesting subject, derive powerful confirmation from the testimony of your able correspondent, Mr. Stainton, to whose remarks (Zool. 1091) I beg leave to refer the curious reader.—*Shirley Palmer, M.D.; Birmingham, February 3rd, 1847.*

Observations on expunging names from the list of British Insects.—In a catalogue, published by J. R. Hawley and A. J. Guns, December, 1846, therein is stated as follows:—"Care has been taken to correct errors, and to reduce the number of doubtful species and varieties, so far as could be done with certainty: it has been considered better to leave varieties than destroy species." Now I affirm, with confidence, that not the least certainty has been alleged to justify the expulsion of *Melitæa Dia* from our list; and, therefore, it is perfectly just that the assumed correction should be revoked. I have recorded in the 'Zoologist' (Zool. 887) the circumstances of my capturing this species, and I beg leave to refer the reader to that account. I again most positively affirm my former statement.

Twenty years ago I captured *Erebia Cassiope*, in abundance, on the highest moorland at the top of Langdale Pikes, 2400 feet in height. I found them on a spot that inclines to the south, overlooking the little Tarn, and near to the pointed rocks known by the name of Stickle Pikes. I recommend any entomologist that may be in that part of the kingdom in July to search the above spot. I have no doubt whatever in my mind that the insects I captured there are quite a distinct species from those of the same genus taken by me in Perthshire, on similar elevation, land and foliage.

A full description of *Erebia Melampus* occurs in a former number of the 'Zoologist' (Zool. 729). All that I know, even as an attempt to disprove the previous claims, has been conveyed in a letter, addressed to me, from a gentleman with whom I have the honour of corresponding, who writes that he has received a communication from Paris, and that his friend M. Pierret says that all the mountain *Erebiæ* are darker coloured and larger, from the high mountains, than those found on hills less elevated. I do not for a moment dispute that such may be the case on the Continent; nevertheless my personal experience and practice proves to me the contrary as regards our mountains. In addition to the before-mentioned remarks, I would observe that *E. Melampus* is stronger and swifter on the wing, and flies higher, than *E. Cassiope*, and I have had a very favourable opportunity of acquiring a knowledge of their habits, from having captured them abundantly at an altitude certainly not less than 2400 feet. This occurred in 1845, in a different locality to my captures of 1844, which I effected at a considerably higher elevation. In conclusion, I would observe that any entomologist that captures a new insect has a perfect right to enquire why its name is expunged from our list.—*Richard Weaver; 152, Bromsgrove Street, Birmingham, Feb. 12th, 1847.*

Note on the treatment of Acherontia Atropos.—The larvæ of this fine insect, which I have before noticed, are still, with the exception of one, remaining in the chrysalis state. The specimen which I expect is the one which went to ground on July 26th, came out October 11th; but though it appears fully expanded, its wings are not quite perfect; I fear it must have struggled on the earth rather too long, for when I found it (the wings not being then arrived at their sufficient stiffness), the insect was struggling to support itself up the side of the box, which seemed too smooth for its feet to hold by, in its weak state, I therefore placed it on some list, supported perpendicularly,

where it rested about a week, and did not, during that time, attempt to flutter about. I placed some sugar, both dry and moist, close by, but could not discover that it had been tasted. The insect then died, and it is now expanded and set. I took the others from the mould, all of which are alive; two of them appeared to be ready to come out, the shell being thin and dry. I had the curiosity to strip one of its shell, using the greatest care possible, and found it beautifully formed, the mark on the thorax being very perfect, and all the colours, so far, quite bright; this was done nearly a fortnight since; and by placing it in a warm situation, I watched, hoping to see it arise and walk, but there it is now—alive, but its wings not expanded; how long it may so remain, is uncertain. I would recommend lining the inside of breeding boxes, above the mould, with cloth, that these heavy insects may, when they burst forth, find good hold for their feet, to support themselves in a perpendicular position.—*T. Goatley; Chipping Norton, November 23rd, 1846.*

Occurrence of Acherontia Atropos, at Ely.—Several caterpillars of *Acherontia Atropos* have been found at Ely, during the present year. I have had two; the perfect insects appeared, one at the end of August, the other on the 7th of September last, a third was brought to me alive, the following week. A domestic cat gave intimation of the appearance of the first specimen, by endeavouring to get at the box, in which the chrysalis had been placed, probably mistaking the cry for that of a mouse. In 1837 I had seven caterpillars, all taken from the tea-tree (*Lycium Europæum*), one of them was of a dark brown colour, with the head and neck of a most beautiful white; all died in the chrysalis state.—*Marshall Fisher; St. Mary's Ely, 15th October, 1846.*

Sphinx Ligustri, three years in the pupa state.—On the 11th of June, 1846, I bred a female of *Sphinx Ligustri*, which had remained three years in the chrysalis, the eggs having been deposited in 1843; the greater portion of the brood came to maturity in 1844, four or five last year, and the last one this year. I have reared this insect from the eggs every year, for the last eight years, and in every brood, some individual specimens have remained two years in the chrysalis. The specimen bred on the 11th of June, is richer in colour than those bred at the usual time; perhaps, like *Chariclea Delphini*, it improves in colour by lying longer in the chrysalis. On the 30th of August, I bred a male of *S. Ligustri*, from a larva hatched from eggs of this year, and which had only remained about a month in the chrysalis state.—*Henry Longley; 1, Eaton Place, Park Street, Grosvenor Square, November 5th, 1846.*

Capture of Mamestra nigricans, near Gillingham.—In my journey to Sheppy, I staid a short time at Chatham, and in my rambles among the salt-dykes, near Gillingham, and close to the banks of the Medway, found a pupa of this insect under a stone, which eventually changed to a very finely marked female. I understand Mr. Samuel Stevens found the larva in a similar situation, this year, near Gravesend, in tolerable plenty.—*T. Ingall; Bank of England, December 11th, 1846.*

Occurrence of Noctua Templi, near Carlisle.—Will you please to insert in 'Zoologist' the capture of *Noctua Templi*. I got a very fine specimen this day, taken in the city of Carlisle, and I had the pleasure of taking it out of the sets. This being the first known specimen that has been taken in Cumberland, it will add to the localities of this northern species.—*James B. Hodgkinson; Harraby, near Carlisle, 31st October, 1846.*

Capture of C. vetusta, at Tankerley Park.—A magnificent specimen of *C. vetusta* was taken by my father at sugar in his garden, about a month ago. The timid

habits of this beautiful insect and its congener, exoleta, render them truly interesting to the entomologist.—*J. Johnson, Jun. ; Collegiate School, Huddersfield, November 23rd, 1846.*

Capture of Calocampa vetusta near Huddersfield.—I have to record the capture of an exceedingly well-marked specimen of *Calocampa vetusta*. I took it at sugar on the 3rd of November, in company with its congener, exoleta. I took specimens of the commoner insect on the previous and succeeding evening, but I have as yet seen but one of the brood of *vetusta*.—*Peter Inchbald ; Storthes Hall, Huddersfield, November 17th, 1846.*

Capture of Polia occulta, near Huddersfield.—On the 7th of last month I captured at sugar, a specimen of the *Polia occulta*, somewhat wasted. It was attracted to the composition in company with the common *Phlogophora meticulosa* and *Orthosia litura*. The same evening I took *Gortyna micacea*, and an unusual abundance of *Agrotis suffusa*.—*Peter Inchbald ; Storthes Hall, Huddersfield, October 16th, 1846.*

Occurrence of Apamea unanimitis, near Sheffield.—Several very fine specimens of *Apamea unanimitis* have been taken last August, by a friend of mine near Sheffield.—*J. Johnson, Jun. ; Collegiate School, Huddersfield, November 27th, 1846.*

Occurrence of Phlogophora meticulosa, in January.—On Thursday last, January 14th, a living specimen of the angle-shades moth (*Phlogophora meticulosa*), evidently fresh from the chrysalis, was brought to me by a friend, who had that day found it resting on the wall of his house at Stafford. Its appearance during a severe frost in January, seems unusual. Stephens, speaking of this moth, says, “the imago appears towards the end of the April, again in the middle or end of June, and a third brood in September.”—*H Aust. iii, 84.* If you think the occurrence of this common insect at such an inclement season of the year, worthy of notice, perhaps you will give it a place in the ‘*Zoologist*.’—*Robert C. Douglas ; Farebridge, Stafford, January 19th, 1847.*

Note on the Graphiphora subrosea of Stephens.—I observe in the ‘*Zoologist*’ (Zool. 1515) a notice of the re-appearance and capture of *G. subrosea*, but without a date. Twenty years ago I spent thirteen weeks in exploring the extensive fens on the borders of Whittlesea Mere, and, whilst sojourning there, I was fortunate enough to capture several pairs of *G. subrosea* on Yexley Fens, about midway between the villages of Yexley and Home. The first I captured I viewed with admiration, being the first of the species I had ever seen; added to which, its extraordinary length of antennæ made it particularly interesting. This moth, in the evening twilight, I found attracted by the blossom of the teasel, and in no instance did I observe it on any other plant, although various other flowers blossomed in the same spot. The teasel flowers in July; therefore this fact will fix, with tolerable precision, the time this moth is on the wing. I have not searched for this insect since the above date, but have repeatedly pointed out to my friends the exact spot, and also all the particulars connected with my former captures. Last season a collector of experience was sent, by an eminent and indefatigable entomologist, to the fens, for the express purpose of searching for the insect, but, after remaining there some time, he returned without accomplishing the desired object; however, being again dispatched to the same spot, his efforts were crowned with complete success.—*Richard Weaver ; 152, Bromsgrove Street, Birmingham.*

Occurrence of Acronycta Alni near Doncaster.—I have had the good fortune this year again to breed *Acronycta Alni*. On the 27th of July I found a larva of this insect crawling on a wall: I placed it in my breeding-box, and thought it had gone

down into the earth, as the last one I had did; but on looking the next day, I found it gnawing the wood near the top of the box, and endeavouring to make a case. It was immediately removed into a flower-pot, containing earth, and supplied with leaves, pieces of bark, and some fragments of decayed wood; it chose the latter, probably on account of its softness, and formed a case on one of the pieces, covered with chippings, similar to those of *Cerura vinula*, but looser in texture. I observed, while forming its case, that when any of its spines interfered at all with the freedom of its movements, it immediately bit them off. On September 18th I was much surprised to find a splendid female moth had emerged from the pupa, which had the abdomen thin and small, apparently quite destitute of eggs.—*John R. Hawley; Hall Gate, Doncaster, October 19th, 1846.*

Causes of occasional scarcity among Lepidoptera.—The passing remarkable season has brought forcibly before our notice two circumstances respecting Lepidoptera which had not previously, that I am aware, attracted much attention, but which will, in a great measure, I think, account for their occasional abundance or scarcity; these are, the appearance out of season of the perfect insect, and the number of barren females. When moths which should come out in June make their appearance after the middle of September,—as in my *Alni*, for instance,—it is obvious that, even in the case of fertile eggs being deposited, the young larvæ must perish for want of food. But probably a more frequent cause of scarcity is a want of fertility in the female, which may have its origin in atmospheric influences, or be the result of some accidental quality in the food of the larva. Perhaps the same cause that has produced extensive disease in the vegetable kingdom may have equally influenced the insect world: be that as it may, I think it behoves every naturalist to make and record careful observations in his own peculiar department, with a view to the elucidation of these phenomena, and the discovery, most probably, of some new and interesting feature in the economy of creation. From whatever cause, the number of *mistimed appearances* and barren females has this year been unusually great. In spring I bred a number of *Orthosia munda*; they were very fine, but marked by two peculiarities,—the absence of the black spots in the wing in every individual, and in the females, the thin shrunk-up abdomen entirely destitute of eggs. I was anxious to perpetuate the breed, that I might try the result of a variety of food with the larvæ, but the females seemed to possess no attractions whatever for the males, and I of course failed. In this case I thought the food might have been the cause, as they were fed entirely on poplar. Last year, the female *Mamestra suasa* that were taken here, were all of the thin-bodied kind, and not an egg was obtained from them. This year the females were all plump, and invariably deposited their eggs soon after being caught, while, on the other hand, every female *Orthosia populeti*, *O. miniosa*, *Glæa rubricosa*, *Apamea congener*, *Xylophasia scolopacina*, and *Acronycta ligustri*, that I have taken, have had the thin barren appearance, and been evidently quite destitute of eggs. It would be curious to ascertain whether this peculiarity is invariably the effect of external causes, or whether some genera and species are more liable to it than others; and such can only be done by careful observation. Can it be that there is among moths, as among bees, &c., a third sex? If so, as among bees, the perfect development of the female is known to be the result of peculiar food; so we may, perhaps, in this cause find a solution for the mystery in question, and eventually be able to insure the perpetuation of rare broods by attention to the food of the larvæ.—*Id.*

Capture of Catocala Frazini at Yarmouth.—A specimen of this insect was captured in or about the workhouse, in August last. Another was seen sitting upon the wall next an upper window, but was not taken.—*George Fitt, Jun.*

Capture of Anticlea berberata near Chelmsford.—Observing Mr. Doubleday's note respecting the capture of *Anticlea berberata* at Epping (Zool. 581), I thought it might be worth stating, that I have taken a single specimen near here this year; it was beaten out of a hedge in June, appears to be a female, and is a little worn.—*A. Greenwood; Chelmsford, 9th December, 1846.*

Capture of Glypteryx eximia near London.—I have met with this beautiful but very local insect very plentifully in a lane leading from Hackney Marshes to Stratford; the first time I met with it on July 10th, 1842, and again, the 4th July, 1844, and in 1845 on the 30th June, and again, in 1846 on the 5th June, and took upwards of 100 specimens in one evening.—*W. E. Pattenden; 25, Union Street, Kingsland Road, London, January 11th 1847.*

Capture of Agdistes Bennetti in the Isle of Sheppy.—I took a specimen of this rare plume, but injured by sweeping, on the 1st of August last, in the Isle of Sheppy, and had another very fine one in my net, but could not secure it, it being blown out by the wind, which was very strong all the morning. The afternoon was remarkable in the country around London, for the great hail-storm.—*Thomas Ingall; Bank of England.*

Remarkable aberrant structure in a specimen of Callimome.—A specimen of *Callimome elegans*, forwarded to me by Mr. Clear, from Cork, presents a remarkable peculiarity in the structure of the underside of the abdomen. The female of *Callimome* and many other genera has a ridge along the abdomen beneath, at the end of it the oviduct emerges, and is received into a groove till it reaches the tip of the abdomen, where it passes between its sheaths. But this specimen instead of a ridge has a protuberance like a horn, more than half the length of the abdomen with which it forms a right angle, the oviduct springs from its base.—*Francis Walker.*

Rose-galls, or Robin's pincushions.—These galls formed by *Rhodites Rosæ* are also inhabited by a smaller gall-fly, one of the inquilini, and by an *Ichneumon* fly. I have also reared from them *Eurytoma plumata*, *Callimome bedeguaris*, *C. macrop-terus*, and *C. flavipes*.—*Francis Walker.*

Capture of Chalcis sisipes in the Isle of Sheppy.—I swept a single specimen from off the rush (*Scirpus maritimus*). Last year I took four in the Isle of Sheppy; but I was either too late this year, which I suppose was the case, or their scarcity arose from the rushes having been cut down for food for donkeys, and were only half grown up again. Of *C. clavipes*, which last year was in great plenty, I only took two or three.—*Thomas Ingall; Bank of England.*

Enumeration of the British Bees.—I have drawn up the following enumeration of the genera and number of species of British bees, as far as I am at present acquainted with them; there are doubtless a few others scattered in collections, which I have not had an opportunity of examining, but the result as to number is very remarkable, since seventy-one of Kirby's species, consisting principally of sexes united to their partners, have been sunk, and seventy-one new species discovered. This list will probably be interesting to some of the readers of the 'Zoologist,' and will doubtless be looked upon as a curiosity at some future period, when entomology has reached the advanced stage, towards which it has made such rapid strides of late years; for it will then show, how very limited was our knowledge of the actual number of indigenous species of bees; for when remote parts of the country are carefully explored, many

highly interesting species will doubtless be found, particularly in the genera *Haliectus*, *Andrena*, and *Nomada*.—*Frederick Smith ; January 1st, 1847.*

Genera.	New Species.	Sunk Species.	No of Species, Kirby.	No of Species, Smith.
<i>Colletes</i> ...	2	...	2	4
<i>Hylæus</i> ...	9	...	4	13
<i>Sphecodes</i> ...	2	2	6	6
<i>Haliectus</i> ...	8	7	25	26
<i>Andrena</i> ...	23	16	71	78
<i>Cilissa</i> ...	...	...	2	2
<i>Dasypoda</i> ...	...	...	1	1
<i>Macropis</i> ...	1	...	...	1
<i>Panurgus</i> ...	...	1	3	2
<i>Nomada</i> ...	7	16	31	22
<i>Melecta</i> ...	1	...	1	2
<i>Epeolus</i> ...	...	...	1	1
<i>Cælioxys</i> ...	3	1	2	4
<i>Stelis</i> ...	2	...	2	4
<i>Megachile</i> ...	4	1	6	9
<i>Anthocopa?</i> ...	1	...	...	1
<i>Anthidium</i> ...	...	...	1	1
<i>Chelostoma</i> ...	...	1	2	1
<i>Heriades</i> ...	...	...	2	2
<i>Osmia</i> ...	4	...	7	11
<i>Eucera</i> ...	...	3	4	1
<i>Saropoda</i> ...	...	3	6	3
<i>Anthophora</i> ...	...	...	2	2
<i>Ceratina</i> ...	...	...	1	1
<i>Apis</i> ...	...	...	1	1
<i>Bombus</i> ...	4	20	37	21
	71	71	220	220

Description of British Bees belonging to the Genus Andrena of Fabricius. By FREDERICK SMITH, Esq.

Genus.—ANDRENA, *Fabricius*.

Apis, Linnæus. *Melitta*, Kirby.

THIS is the most extensive genus of bees indigenous to Great Britain: I am at present acquainted with nearly eighty species, and no doubt, many more remain to be discovered. Their sombre colouring, and the very great similarity of many of the species, have no doubt, in some degree, caused them to be somewhat more neglected than the

larger or more gaily coloured species of bees. As far as I have observed the habits of this genus, I have found them to be burrowers in the ground, the species differing in the choice of their situations: some preferring sloping banks of light earth, as *A. bicolor*, *nigro-ænea*, *tibialis*, &c.; others, as *A. Rosæ*, *fulvescens*, *albicrus*, &c., choosing hard-trodden sandy path-ways. Their burrows are usually from six to ten inches in depth: having stored up a sufficient supply of pollen and honey for one grub, the bee deposits an egg and closes up the cell; this she repeats until the necessary number of cells are stored; when, her task being completed, she carefully closes up the mouth of the cell.

Notwithstanding all the care and assiduity with which these bees protect and provision their nests, they are subject to the parasitic intrusion of various insects; thus, the Genus *Nomada* are almost exclusively parasitic upon these bees, some indeed, appear to attach themselves to particular species; thus, *Nomada ferruginata* I never found frequenting any other nests than those of *A. fulvescens*,—*Nomada baccata*, those of *A. argentipes*, &c.: to some extent these connexions appear constant, but occasional deviations from the force of circumstances will no doubt be met with. A wide field for investigation yet remains unexplored as to the true nature of the connexion between the industrious bee and its parasite. I have found the *Nomada sex-fasciata* in the cells of *Eucera longicornis*,—and here I may observe another instance of admirable foresight, a beautiful adaptation of economy to circumstances—*Eucera longicornis* being a much larger insect than its parasite, of course stores up double the quantity of food required by one larva of the *Nomada*, two eggs are consequently deposited; whether this is always the case I do not know, but having in two instances found it so, we may reasonably draw this conclusion. Independently of the attacks of parasitic bees upon the food of the larva, the bodies of the perfect insects are infested by various species of *Stylops*: in my own collection I have about twenty different species thus attacked. The orange-coloured larva of *Meloë* is also found upon various species, as well as a larger black larva, named by Mr. Kirby, *Pediculus Melittæ*; what this is really the larva of, has not been correctly ascertained. I have also occasionally found a minute species of *Acarus* infesting them.

The sexes of many of the species are so very dissimilar, that it is only by close attention to their habits they can ever be correctly united; many are still unknown, but several have been ascertained since the publication of Mr. Kirby's Monograph; the following spe-

cies I have at various times taken *in coitu*,—*Andrena albicans*, *nitida*, *tibialis*, *fulva*, *Clarkella*, *fulvicrus*, *labialis*, *chrysosceles*, *albicus*, *fulvescens*, and *argentipes*; and this had enabled me to unite several not previously ascertained. I have also carefully observed the times of appearance of a large number of the species; some, should the weather prove favourable, are to be met with at the end of March, but during April and May the majority are found: a few, however, are autumnal insects. As a general rule, I have observed that those species whose bodies are covered with pubescence, appear in early spring; others, as *A. Rosæ*, *hæmorrhoidalis*, &c., whose bodies are nearly naked, do not appear until the later and hotter months of the season. Although these bees are solitary, each bee forming its own nest, still at times they congregate in large numbers, forming extensive colonies; the largest I ever observed, was one of *A. fulvescens*, occupying a space of twenty yards in length, and about two in breadth; the burrows were innumerable, and so multitudinous were the bees, that hundreds might be captured by sweeping a net over the ground.

Generic characters.—Antennæ subclavate in the female, filiform in the male; mandibles long, much longer in the male than the female; labial palpi four-jointed; maxillary palpi six-jointed; the tongue short, flat, generally acute, not folded backward; the wings with one marginal, and three submarginal cells; the female furnished with a floccus at the base of the posterior thighs, and the posterior tibiæ and first joint of the tarsus have a thick scopa, or pollen-brush. Abdomen of the female ovate, having six segments, that of the male oblong-ovate, or lanceolate, having seven segments.

Sp. 1. *ANDRENA HÆMORRHOIDALIS*, *Fab.*

Melitta hæmorrhoidalis, *Kirby.*

Female.—(Length 6—8 lines). Black, shining, the face thinly clothed with griseous hair, a line of short silvery hair along the inner margin of the eyes; the antennæ rufo-piceous beneath. Thorax punctate, with three slightly impressed lines on the prothorax; the tegulæ and nervures ferruginous; the wings testaceous, their apical margins clouded; the legs have a fulvous pubescence, the floccus pale fulvous, the scopa bright fulvous, the tarsi ferruginous. Abdomen oblong-ovate, depressed, the first segment, excepting the extreme base, is red, as is also the whole of the second, and the apical margin of the third; the second segment has a lateral black dot on the margin of the

second and third segments laterally, and continuously on the fourth is a narrow fascia of white hairs; the apical fimbria is rufo-fulvous; beneath the second segment is red.

Var. 2.—Only the margin of the first and base of the second segment of the abdomen red.

Var. 3.—Abdomen black, the margins being only very obscurely ferruginous.

Male.—(Length $6\frac{1}{2}$ lines). Black, the antennæ piceous beneath, the clypeus white, with two black dots; the thorax has a thin griseous pubescence, sparing on the disk; the tarsi ferruginous. Abdomen oblong-ovate, the margins of the segments slightly piceous and depressed, with a pale fulvous pubescence at the tip.

This fine insect is the largest of the genus. Variety 1, is the *Melitta Lathamana* of Kirby, it is rare, the insect being generally found altogether black. I once took this bee at Birch Wood, and also once at Darenth Wood, Kent; I have known it to be taken three or four times at the latter place, but not in any numbers, only three or four of the red-banded variety have come to my knowledge, one of which I captured myself in the beginning of August, 1839.

Sp. 2. *ANDRENA ROSÆ*, Panzer.

Melitta Rosæ, Kirby.

Female.—(Length $4\frac{1}{2}$ —6 lines). Black, the antennæ piceous beneath; the mandibles ferruginous at their tips, having a minute obtuse tooth at their base, a little pale fulvous pubescence along the inner margin of the eyes; the clypeus coarsely punctured. Thorax very delicately punctate, with large punctures regularly intermixed, a little pale pubescence on the sides, and beneath; the disk generally naked; the tegulæ piceous; the wings testaceous; all the legs clothed with pale fulvous hair; the scopa also pale beneath, but fuscous above. Abdomen, the margin of the first, and the whole of the second and third segments red, a black spot in the centre of the third, extending a little within the margin of the second segment; the apical fimbria reddish brown; beneath, the second segment is red.

Var. 2.—Abdomen, with the margin of the first segment laterally, and of the second entirely red; beneath, the sides of the second segment red.

Var. 3.—Only the sides of the second segment red, above and beneath.

Var. 4.—Only the sides of the second segment beneath red.

Male.—(Length 4 lines). Black, the antennæ as long as the head and thorax, the joints slightly curved; the face clothed with pale brown hair. Thorax, the sides clothed with pale fulvous hair, very thinly so on the disk; the tegulæ dark piceous; wings subtestaceous, the apical margins clouded, the posterior tibiæ and all the tarsi rufo-piceous; the claws ferruginous. Abdomen lanceolate, nigro-piceous, the apical margins of the two basal segments rufo-piceous, sometimes of only the basal segment, the apical segment has a pale fulvous pubescence; beneath, the second, and sometimes the base of the third segment pale ferruginous.

This is the true *Andrena Rosæ* of Panzer; Mr. Kirby's varieties 4 and 5 belong to a distinct species, which I shall next describe. The male of *A. Rosæ* is the *Melitta zonalis* of Kirby's monograph. This is one of the rarest species of the genus: some years ago, I captured a single female at Darenth, Kent; and on the 11th of August, 1844, at Shirley, near Croydon, I took twelve specimens, three males in company, and this circumstance, united to their specific resemblance, satisfies me as to their identity. Mr. Heales, also met with two or three females at Hastings, in 1844. The range of variety in this species is very great, every shade occurring between the highly coloured, and black specimens; the highly coloured are the most rare.

Sp. 3. *ANDRENA RUBRICATA*, *Smith*.

Female.—(Length $6\frac{1}{2}$ lines). Black, the face clothed with a yellowish-brown pubescence; the antennæ rufo-piceous beneath; the thorax has a pale fulvous pubescence, darkest on the disk; the tegulæ dark piceous; wings subhyaline, clouded at their margins; the floccus at the base of the posterior femora beneath, is pale yellow, as is also the scopa beneath, above it is dark brown; claws ferruginous. Abdomen punctate, the apical margin of the first segment red, the second laterally, its margin, also that of the third, and sometimes of the fourth also, red; the apical fimbria fuscous, beneath the second segment is sometimes red laterally.

Male.—(Length $5-5\frac{1}{2}$ lines). Black, head rather wider than the thorax, the pubescence on both pale fulvous; the legs have a reddish brown pubescence; the tarsi are ferruginous. Abdomen punctate, ovate-lanceolate, the margin of the first, and the whole of the second segment red, the margin of the third rufo-piceous; or, only the margin of the first and second, and sometimes of the third, rufo-piceous;

beneath the second segment is generally red, with a black stain in the centre.

This is a very distinct species from *A. Rosæ*. Mr. Kirby's varieties, 4 and 5 are identical with it. Mr. Kirby conjectures they may be distinct, and notices the absence of the minute obtuse tooth at the base of the mandibles of the female: another character will at once separate them, the abdomen of *A. Rosæ* is not punctate, or very delicately so, but that of *rubricata* is regularly and distinctly so. The antennæ of the male of the present species are only about two-thirds the length of those of *A. Rosæ*, and the joints are not bent. The female seldom varies, but the male has sometimes the second segment of the abdomen red; this variety is however rare. I have met with both sexes abundantly at Highgate, Weybridge, and Hawley, Hants; it appears about the middle of June.

I have observed that this bee seldom frequents any flower but that of the wild bryony.

Sp. 4. *ANDRENA DECORATA*, *Smith*.

Female.—(Length 6—6½ lines). Black, the antennæ piceous beneath; the face clothed with a pale fulvous pubescence. Thorax coarsely punctured, the sides and beneath have a pale fulvous pubescence, sparing on the disk; the tegulæ rufo-piceous; the nervures testaceous; the floccus very pale fulvous: the scopa fulvous; all the tarsi rufo-piceous; the claws ferruginous. Abdomen, the basal segment has a broad red fascia on its apical margin, the second is red laterally, as well as its margin; the anal fimbria is reddish brown; beneath, the second segment is red, with a black stain in the centre.

Male.—(Length 5½ lines). Black, the face has a light brown pubescence; the antennæ are as long as the head and thorax, the joints slightly curved; the thorax has a pale fulvous pubescence on the sides, sparing on the disk; the tegulæ rufo-piceous; the nervures testaceous; the legs rufo-piceous; all the tarsi pale testaceous; claws ferruginous. Abdomen lanceolate, the margins of the three basal segments rufo-piceous; beneath the second segment and apical margin of the third rufo-piceous; the second has sometimes a dark stain in the centre.

This species approximates closely to *A. Rosæ*, but is quite distinct; the female differs from that of *A. Rosæ* in having the thorax deeply and closely punctured, and scopa bright fulvous. The male differs from the same sex of *A. Rosæ*, in having the neuration of the wings

much more delicately pale, in its more slender legs and paler tarsi. Of this beautiful species I captured two specimens of each sex at Birch Wood, Kent, in 1842, since which, I have not met with it. I expect it is extremely local and rare.

Sp. 5. *ANDRENA CINGULATA*, St. Fargeau.

Nomada cingulata, Fab. *male*. *Andrena labiata*, Fab. *female*.

Melitta cingulata, Kirby. *Apis albilabris*, Panzer, *male*.

Female.—(Length $4\frac{1}{2}$ lines). Black, shining, the pubescence cinereous, a line of short white hair along the inner margin of the eyes; the antennæ rufo-piceous beneath. Thorax, the tegulæ rufo-piceous; the wings subhyaline, their apex slightly fuscous; the nervures nigropiceous; the floccus white, as well as the scopa beneath, above it is fulvous. Abdomen ovate, finely punctured, the second and third segments red, the second has on each side a small black dot, the anal fimbria fulvous; beneath, the second, third, and base of the fourth segments red.

Male.—(Length 4 lines). Black, with a white pubescence; the clypeus white, with two black dots; the antennæ fulvous beneath. Thorax, the tegulæ piceous; the wings as in the female. Abdomen oblong-ovate, very convex, the second, third, and base of the fourth segments laterally red, the second has a minute black dot on each side.

This species does not appear to be subject to much variation. I have frequently captured it in the neighbourhood of London, in May and June; but it is rather a local species.

Sp. 6. *ANDRENA CETII*.

Andrena marginata, Fab.—St. Fargeau. *Apis Cetii*, Schrank. *Melitta Schrankella*, Kirby.

Female.—(Length 5 lines). Black; the antennæ fuscous, the scape black; the face has a thin hoary pubescence; the clypeus coarsely punctured; a line of short silvery hair along the inner margin of the eyes. The thorax has a pale fulvous pubescence; the tegulæ black; the wings subhyaline, their apex slightly clouded; the legs have a cinereous pubescence, which is also the colour of the floccus, and of the scopa beneath, the latter is of a brownish-black above. Abdomen oblong-ovate, clothed with a thin fulvous pubescence, the margin of the first segment, and the whole of the second and third red; or with

merely the base of the third red, the second and third segments with a lateral black dot, sometimes also a central dot; in some instances only the margins of the segments are rufo-piceous: beneath, one, two or three segments red.

Male.—(Length 4 lines). Brown-black, clothed with pale fulvous pubescence; the antennæ fuscous; the clypeus white, with two black dots; the wings subhyaline, their apex clouded. The abdomen oblong-ovate, the margins of the segments slightly piceous, tip of the abdomen pale fulvous; beneath, the segments have a marginal fringe of pale fulvous hair.

The female of this species is extremely variable in the colouring of the abdomen, every shade of variety occurring between the extremes described. The pale fulvous pubescence of recent specimens soon fades, so that the general character is hoary. Mr. Kirby's *Melitta affinis* is undoubtedly a variety of *A. Ceti*. I possess a similar variety taken in company with the highly coloured specimens. Mr. Kirby used to take the female in Suffolk; the male he did not know, and I believe it is now first described. I have taken this bee in Hampshire, and have received specimens from Mr. S. Stevens, taken by him in Sussex, in August.

Sp. 7. *ANDRENA SPINIGERA*.

Melitta spinigera, Kirby.

Female.—(Length 6 lines). Black, with a fulvous pubescence; the mandibles ferruginous at their tips; the face clothed with dark brown hair. Thorax, the tegulæ dark piceous; the wings hyaline, their nervures piceous; the legs dark rufo-piceous; the floccus and scopa beneath pale fulvous, the latter dark brown above; the tarsi ferruginous. Abdomen, two minute dots on the basal segment, its margin, and also the margin of the second, ferruginous; the apical fimbria black; beneath, the second segment is sometimes wholly, sometimes only at the base red.

Var. 2.—The red spots on the basal segment obsolete.

Male.—(Length 5—5½ lines). Black, with a light brown pubescence; head large, the pubescence on the face black; the mandibles long and curved, their tips ferruginous and acute, having a long filiform spine at their base beneath; the antennæ nearly as long as the head and thorax, the joints slightly curved. Thorax, the tegulæ piceous; the wings hyaline, their apical margin clouded; the tarsi fer-

ruginous. Abdomen lanceolate, the margins of the segments rufo-piceous.

Var. 2.—Abdomen with the second segment red at the base.

Var. 3.—Abdomen, the margin of the first, the whole of the second, and the base of the third red.

This species is rare. I have taken both sexes at Highgate, but not in any numbers. Mr. Kirby has described his insect as a female, which is certainly a mistake in printing, the original specimen in the Kirbayan collection being ticketed as a male. The red-belted variety described, is in my collection, and the only one I have seen; it was captured by Mr. S. Stevens, at Bexley, Kent, in the beginning of April, which is the usual time of its appearance. It also occurs in the New Forest, Hants.

Sp. 8. *ANDRENA FEROX*, *Smith*.

Male.—(Length $4\frac{1}{2}$ lines). Black, a few pale fulvous hairs on the face; the clypeus very bright and shining, with large distinct punctures; the antennæ nigro-piceous, as long as the head and thorax; the mandibles long, bent, and acute at their apex, having a short acute tooth at their base beneath; the head is one-third wider than the thorax. Thorax, the tegulæ piceous, wings hyaline, their apical margins slightly clouded, the nervures testaceous; the apex of the anterior and intermediate tibiæ, the whole of the posterior pair, and all the tarsi pale rufous. Abdomen lanceolate, the margin of the first and second segments are rufo-piceous; beneath, the second and third segments are rufo-piceous.

This is one of the most remarkable insects which I have seen belonging to the genus: its large disproportionate head, and its curved long mandibles armed at their base, render it a most ferocious-looking insect; its female is not known. It is very distinct from *A. spinigera*; its tooth, or spine, is not more than half as long as in that species, and its legs are of quite a different colour. This species was first captured by Mr. Devignes near Windsor, and to that gentlemen I am obliged for my specimen; the science is thus again indebted to Mr. Devignes, who has, by his labours, in several instances, added numerous rare and interesting insects to the British Fauna.

(To be continued.)

Preserving of the Honey Bee.—Mr. Hughes' "desire (Zool. 1459) to see a better, a more humane system prevail among our poorer apiarians," by circulating among them "a plain and simple letter" on the subject, may be obtained far more easily through Mr. Cotton's "short and simple letter to cottagers" than by his "Bee Book." The "Bee Book" is a large volume, beautifully got up, and I think half-a-guinea, if not more in price; whereas his short and simple letter is to be had at three-pence, from the Society for promoting Christian Knowledge, Great Queen Street, Lincoln's Inn Fields. It was formerly published at Oxford, at two-pence.—G. Gordon; Birnie, Elgin, N.B.

A huge Tree destroyed in one year, by a longicorn Beetle.—There stood, two years ago, on the Peninsula Colabah, a large and flourishing Adansonia digitata, about three hundred years old, and forty-four feet in circumference, and which in one year was entirely destroyed by Lamina sentis, belonging to the family of capricorn beetles. Looking at the outer bark there were, with the exception of a few holes, no traces observable of (the devastation) its destruction. This beetle is eaten by the natives, and when preserved in sugar, is regarded as a great delicacy by the Chinese and Malays.—Orlich's Travels in India, vol. i, p. 58,—Isaac Taylor, (trans.) August 4th, 1846.

Notes on the habits of the Dyschirii.—There are few groups of our British Coleoptera which have been more neglected than the Dyschirii. Partly from their apparent rarity, and partly from other causes, most entomologists assert that they "cannot find them." Whether it is that they are not generally searched for, or that the research be fruitless, it is impossible to say; but so far as my experience goes, I should be inclined to ascribe their "rarity" to the former cause, for I seldom fail myself of obtaining an abundance of specimens in positions, similar to those hereafter to be mentioned, which experience has shown me are most likely to produce them. Although they occur both inland, and upon the coast, it is the latter which affords by far the greater number of species; which is, perhaps, one reason why the generality of our entomologists are, for the most part unacquainted with them. There are but two soils on which I have myself ever succeeded in procuring them in any abundance; the first is sand, which is by far the most prolific: and the second,—the alluvial deposits of the fens; which also produce a profusion of specimens, but usually only two or three species. Owing to much confusion which has existed, I am aware of the extreme difficulty of arriving at satisfactory conclusions respecting their true names; nevertheless, partly from my own exertions, but more particularly through the kindness of my friend Mr. Haliday, who has lent me his valuable assistance, I have succeeded in giving the species those titles which appear to be the most legitimate. The fens in the Isle of Ely and in the neighbourhood of Cambridge, have one species which is most abundant; this is the common gibbus. A flood never occurs without washing them up in the greatest profusion; and during the whole summer months they may be found by hundreds, under the decayed sedge and rubbish, which is cleared out of the ditches, and allowed to remain in heaps along the banks. At Whittlesea Mere and in the adjoining fens of Huntingdonshire, there are two species which may be literally said to abound. These are æneus (Zeigler, De Jean, Erichson and Heer), and a minute species which I had named minimus (of Curtis), but which Mr. Haliday is inclined to consider a small variety of gibbus. The first of these is a very distinct species, and has been usually looked upon as one of the rarest of the genus. Mr. Haliday captured a few specimens of it some years ago near Holywood, in the north of Ireland; and on examining a long and variable series which I sent for his inspection, observed to me that the species

*ærat*us (with a fold down the forehead), is without doubt one of the varieties of *æneus*, the insect under consideration, to which therefore it ought to be referred. My series contains a great number of varieties; one of which (a black and tolerably common one), corresponds exactly with the *tristis* of Stephens, having the same "obscure hue and pitchy apex to the elytra" which he describes. The second species referred to,—so abundant in the Huntingdonshire fens, and which I had named *minimus* of Curtis,—whether it be strictly referred to *minimus* or *gibbus* I am not able to decide; but if it be a small variety of the latter (which Mr. Haliday thinks probable), it is certainly a permanent one, for, out of hundreds which I have taken, the size is invariable, and always smaller than the typical size of *gibbus*. Singularly enough, in a communication which I received a short time ago, from my friend Mr. Dale, he mentions (in answer to a question which I put to him "whether he possessed any *Dyschirii*"), that, when on a visit to Whittlesea Mere, some years ago, he "captured three or four specimens of *Dyschirius minimus*," and this without my having ever disclosed to him that I had also taken there in profusion, what I considered to be the self-same species; from which it appears that his species and mine must be the same, and that, therefore, if it be not distinct from *gibbus*, the variety is at least a permanent one. Happening to be there on an entomological trip during June of the present year, I had a good opportunity of observing the habits of the two species just referred to. Unlike the *Hesperophili* (which are nearly always found in the same localities), they only come out during the heat of the day, and may be seen, running in multitudes on the muddy flats which occur on the sides of the loads and the edges of the mere, and which often, during the winter season, form impassable barriers to the sportsman. By sitting down on the edges of these flats in a scorching sun, I have at times experienced much amusement by seizing the insects as they rushed from one crevice to another,—where, with *Dyschirii* and other species, a bottle may very shortly be filled. In addition to the *Dyschirii*,—*Georyssus pygmæus*, *Heterocerus pusillus*,? *Lopha pæcila* and *Doris*, *Notaphus undulatus*, *Peryphus littoralis* and *Elaphrus cupreus* may be seen running in the utmost profusion, with occasional specimens of *Dromius bipennifer*, *Elaphorus uliginosus* and *Omaseus aterrimus*. Much in the same locality in Carmarthen, in South Wales, I might have taken the common *Dyschirius gibbus* by tens of thousands, in 1845, on the banks of the river Towey; it is, however, a species which appears to be equally common on the coast as well as inland, delighting almost as much in the sand, as in the deep peaty soil of the lowlands. In the Isle of Wight, last May, when in company with my friend Mr. Dawson, we could have captured hundreds in a single sand-heap (which had been formed by part of a cliff giving way between Ventnor and Shanklin), in which we found them burrowed to the depth of more than a foot. At Tenby in Pembrokeshire, I have likewise taken the same species, accompanied with a single specimen of the beautiful *Dyschirius nitidus*; also at Northam Burrows near Bideford (on the north coast of Devon), on the sand-hills facing the sea. At Lowestoft, on the coast of Suffolk, I met with a plentiful harvest during the early part of last July, where I obtained a fine series of the species *nitidus* and *thoracicus* by the following simple process:—the cliffs being composed of sand, I used to stroll along the beach until I saw a *Dyschirius* making his way at their base, when instead of immediately taking him up, I sat quietly down and observed to what crevice he was tending; having watched him safely in, I then split off the sand in extremely thin layers, when numbers of his own species were sure to fall out; this plan I found far more successful than merely splitting away the cliff at random, for the *Dyschirii* being very grega-

rious in their habits, a long time might elapse before their places of concealment were found out; whereas, by watching them to their holes, the object was immediately obtained. It is a remarkable circumstance (and one which I have never seen recorded),* that they are nearly always found in company, as I have before stated, with one or other of the species of the brachelytrous genus *Hesperophilus*. Where I have observed the one, I have scarcely ever failed of finding the other: without strict observations this might not often be apparent, for the two genera being in their times of appearance essentially dissimilar,—the *Dyschirii* coming out only in the heat of the sun, and the *Hesperophili* (as indeed their name imports) solely in the evening,—it is not likely that this singular fact would be noticed: nevertheless, while capturing the *Dyschirii* by the above mentioned plan, I have scarcely ever failed of finding at the same time, one or other of the species of *Hesperophilus*, and often in such close connexion with them, that it is perfectly impossible to take the one without upsetting the haunts of the other. At Lowestoft, this was particularly remarkable, where, closely mixed up with the *Dyschirii* already alluded to, were positively hundreds of the beautiful little *Hesperophilus arenarius*. It is curious to speculate on what could be the object of this excessive intimacy, for so far as company is concerned, the habits of the species are too dissimilar, to render them of much service to each other; inasmuch, as when the *Hesperophili* are “at home,” the *Dyschirii* are abroad,—and when the *Dyschirii* are “at home,” the *Hesperophili* are abroad! This great fact was most admirably illustrated at Lowestoft, where, during the heat of the day, the *Dyschirii* might be observed sporting rapidly about in the sun-shine, but verily, not the ghost of an *Hesperophilus*

“Shewed o’er the arid waste his misty form.”

In the evening, however, the *Dyschirii* had entirely disappeared, and their place was taken by their little *Brachelytrous* cohabitants, who were ranging far and wide over the surface of the sand, though with much slower and clumsier movements than were displayed in the rapid and easy motions of *Dyschirius*. At Whittlesea Mere also, in company with the *Dyschirii* above referred to, I captured *Hesperophilus arenarius*; whereas, in the locality at Tenby, in which *Dyschirius nitidus* and *gibbus* occurred, the absence of *arenarius* was supplied by its generic representative, *fracticornis*. In the Isle of Wight, the ‘amalgamation’ we are discussing, was quite as extraordinary as at Lowestoft. Here, however, in addition to the little *Hesperophilus arenarius* (which was in the utmost profusion), the *Dyschirii* were mixed up with the large and beautiful *Bledius armatus*,—a genus which is well known to be closely allied to *Hesperophilus*, and whose habits are in every way the same,—and so intimately were the three genera

* Since writing the above, it has given me great pleasure to learn from my friend Mr. Haliday, that he has observed the same circumstance in the north of Ireland. In an interesting communication of his, on the ‘Zoology of Lough Neagh,’ read by Mr. Thompson, of Belfast, before the British Association at Southampton, in September last, speaking of *Dyschirius thoracicus*, he makes the following observations:—“I have usually found this insect about the burrows of *Bledius tricornis*, but though I searched for the last genus, expecting to meet with some of the section *Hesperophilus*, to my surprise I could discover but a single *Bledius subterraneus* (*Erich*).” Mr. Haliday also writes me word, that the same fact has been observed by Mr. Rudd, who registered an account of it in the *Ent. Mag.* ii. 181, which, however, I have not yet had an opportunity of referring to.

diffused throughout the sand (which was a heap of only a few feet in circumference!). that, although three of us were at work at it for half-an-hour, 'bottling off' its tenant as quickly as possible, we scarcely succeeded at the end of that time in exhausting the locality! I must here conclude my remarks on the *Dyschirri*. Should any of the readers of the 'Zoologist' be able to confirm my observations on the habits of this interesting genus, or be induced, by means of them, to devote a little time to the investigation of its economy, it would give me great pleasure to know the result of their researches, and see how far they may be made to coincide with my own.—*T. V. Wollaston*; *Jesus College, Cambridge*.

A proposed postscript to Mr. Wollaston's note on Nebria livida, (Zool. 1517.)—I should mention that my friends the Wolleys, first told me of this Bridlington locality, with full particulars. They found it out eleven or twelve years ago, and had the pleasure of announcing it to Mr. Arthur Strickland, of Bridlington, who at that time had only two or three specimens from Scarborough, which he valued greatly. The old story was, that *Nebria livida* was to be found "under heaps of sea-weed at high water mark," and in such situations they searched for it in vain, at Bridlington, Flamborough, Filey, and Scarborough; but at least George Wolley found one accidentally, when grubbing under a bank for fishing-baits, within the harbour of Bridlington, and almost simultaneously, his brothers found it in plenty in the cliffs, for several miles along the south sands, living in the numerous cracks and fissures. They never found it between Bridlington and Flamborough, *i. e.* on the north cliffs, which are not so sandy as those to the south. J. W. has also found it in similar situations at Scarborough.—*J. Wolley*; 26, Mount Street, 23rd November, 1846.

Carabus catenulatus attracted by sugar.—Having heard that this species is frequently taken by persons sugaring for moths, I was led to think it not entirely carnivorous. I took a specimen, and fed it during three weeks upon morsels of apple, which it consumed very greedily, and seemed not at all the worse for a vegetable diet. At last it escaped. I also fed a *Carab. nemoralis* upon apples, but it showed very little relish, and died in the third week.—*J. W. Slater*.

Capture of Coleoptera in the North of England.

Blemus pallidus. In my note on *Blemus paludosus* (Zool. 1237,) I remark the general paleness of the specimens: on comparison, I find them identical with specimens of *B. pallidus* sent to Mr. Hardy, from the Isle of Wight, by the Rev. J. F. Dawson. I have this season, again met with it in April and May.

Peryphus lunatus. I have this season found it equally abundant. It varies much in colour according to age; the recently developed specimens have the elytra pale, with the crescent-shaped spot large; and some mature individuals (more particularly the males), have the spot obliterated, its place being indicated by a slight tinge of rust-colour.

P. Leachii? I have specimens which agree pretty well with Mr. Stephens' description of this species. They were taken on the banks of the Derwent.

Peryphus atrocæruleus. I find that I have a good number of specimens of this species. I had confounded it with *cnemerythrus*.

Elmis Volkmar, *E. variabilis*, *E. æneus*, *E. cupreus*. I got these four species in company on weed, in a mill-tail near Newcastle, in September: the second and third in abundance. I have since then found them equally abundant in Cumberland.

Stenhelmis parallelipipedus. I captured a single specimen adhering to the under-side of a stone, in a mossy stream or 'beck' in Cumberland.

Hydræna riparia. Common, particularly in stagnant-pools, adhering to the under-side of floating leaves.

Micropeplus porcatus. Occasionally found in grassy places.

Micropeplus staphylinoides. I got a good number of this species at Long-Benton, in October 1843, flying over decaying straw and dung.

Atomaria nigripennis. Occurs in abundance, in cellars, adhering to the under-side of boards in damp places.

Holoparamesus depressus. I have two specimens of this apparently rare species; they were taken in a shop-window in Newcastle.

Ips 4-pustulatus. I captured a dozen or two of this fine species, in posts and stumps of Scotch-fir (*Pinus sylvestris*), at Walton Wood, Cumberland, in June.

Ips 4-guttatus. I took a solitary individual marching leisurely up a fir-post in the same wood.

Ips ferruginea. In the same locality as the others, but in much greater numbers: it more particularly affects the stumps of such fir-trees as have been cut down for some twelve or eighteen months, running its burrows considerably below the level of the adjacent soil.

Monotoma picipes, *M. angustata*. I find both species on hot-bed frames, in May, June and July.

Rhizophagus ferrugineus, *R. depressus*, *R. dispar*. In posts and stumps of Scotch-fir, I found the first and last in great abundance at Walton Wood, in June: some of the large stumps being tenanted by hundreds of individuals.

Trogosita mauritanica. One of our imported species. It is brought from the East Indies by the trading-vessels which frequent the port. I have seen great numbers of the larvæ in Madras rice, where I have also found *Silvanus Surinamensis*, *S. dentatus*, *S. unidentatus*, and *Calandra Oryzæ*. *T. mauritanica* is of frequent occurrence in shops and warehouses in this town, and I have received it from the country, where it was found amongst flour.

Dermestes lardarius. Of frequent occurrence in houses and shops. Is it well authenticated, that the larvæ feeds on bacon? I find them amongst rubbish in drawers, and other neglected places.

Abreus globosus. Common beneath boards on dung, around hot-beds. I find that boards placed on dung around hot-bed frames, to be a very productive method of collecting, especially for many minute species, and *Brachelytra*.

Oxyomus Sabuleti. I got a pair on the sandy banks of the Irthing, and Mr. Thomas Pigg, Jun., has a specimen, taken by the Derwent-side.

Necrobia quadra, *N. ruficollis*. Plentiful in carcasses. I once saw great numbers of larva, pupa and imago, in the putrid carcass of a dead dog.

Necrobia rufipes. Occasionally in carcasses. I have several specimens taken amongst cheese in shops.

Ptinus hololeucus. Common; appears about midsummer, in warehouses and other places. I once saw hundreds crawling on sacks containing foreign tares, those sacks were coated over with silk, beneath which were great numbers of larvæ, but whether or not, they were the larvæ of this insect, I was unable to determine.

Gibbium scotias. This grotesque fellow is abundant with us, and is generally found in neglected corners of old houses. I have had a good supply from Long Benton, which is some three miles or so into the country.

Anobium molle. Has occurred in profusion near Newcastle, inhabiting Scotch-fir

palings. The tips of the elytra are much paler than the rest of the insect, a peculiarity not noticed by Mr. Stephens. It has a strange partiality for amputating legs and antennæ: the first that I took, and put into quills, actually did not leave each other a leg to stand on: I noticed it from the end of May up to the present time. Mr. Hardy has noticed it in Berwickshire, and found a few stray specimens in Gateshead.—*Thomas John Bold* ; 42, *Bigg Market, Newcastle-on-Tyne, August 19th, 1846.*

Capture of Apion Limonii in the Isle of Sheppey.—I swept two specimens of this insect from the same ground, and thereby established a new locality for both this and Agdistes. Two species of Statice (*Armeria* and *Limonium*) grow in some parts of Sheppey, and in the south bank of the Medway in great profusion, and the latter species was in full bloom.—*Thomas Ingall* ; *Bank of England.*

Capture of Ctenicerus sanguinicollis in Cambridgeshire.—Three specimens of this rare insect have lately occurred at Fulbourn, near Cambridge, and are now in my possession. I had them for a fortnight alive, for the sake of watching their habits. They are much more active than the generality of the Elateridæ, and, when let loose on the table, ran with such activity that it was often difficult to re-secure them. Three specimens were taken from the same tree last year, one of which is also in my collection. Their capture was recorded in the 'Zoologist' by my friend, the Rev. Hamlet Clark, of Northampton, who possesses the remaining pair.—*T. Vernon Wollaston* ; *Jesus College, Cambridge, March 6th, 1847.*

Occurrence of Trichius fasciatus near Ponty-y-pool.—In reply to the observations of Mr. Weaver, (Zool. 1460) that the above insect has not been captured within twenty years, I beg leave to state that I caught one specimen about a mile and a half from this town about eight or nine years ago ; it is the only one I have met with ; it was entering one of the flowers of a foxglove a few yards distance from where I stood. Not having seen one before, I thought it was one of the smaller yellow humble bees, and was very careful when opening the flower to avoid being stung, but to my surprise when I had secured it, instead of a bee I found I had a beetle imprisoned. I have always understood that it was to be found about Swansea and towards Pembrokeshire. I cannot at present refer to my authority for that statement. Entomology has been so little cultivated in this part of the kingdom, that it very probably may yet be found in some of the intervening places between here and Swansea ; as to its absence from England, although we are in this county situated in England according to the civil and political divisions of the kingdom, yet from the natural divisions of the country, soil, climate and general aspect of the county, it may without any strain of language be still considered as a portion of South Wales.—*James Bladon* ; *Ponty-y-pool.*

Capture of Trichius fasciatus near Neath.—I took a single specimen of this beautiful insect on a blossom of *Carduus heterophyllus* near the falls at the top of Neath Vale.—*Alfred R. Wallace, Neath.* [The other insects in my correspondent's list are scarcely worth publishing.—*E. Newman*.]

Descriptions of a few Australian Beetles of the Order Cerambycites.

The beetles to which I have attempted to assign descriptions were brought over from Australia by Lieutenant (now Commander) M. R. Ince, late of H.M.S. Fly, and I am indebted to the kindness of his brother, W. H. Ince, Esq. for the opportunity of examining them. The first and second belong to the family Cerambycidæ, the others to the family Lamiidæ.

Callidium vexatum. Brown. Antennæ 11-jointed, slender, slightly hairy, the third joint much the longest, especially in the male, in which sex the entire antenna is

also much longer. The diameters of the prothorax are about equal; the lateral margins are rounded and perfectly unarmed; the dorsal surface somewhat flattened and scabrous, as with confluent punctures. The elytra are as wide as the prothorax in the male, wider in the female; their lateral margins straight; their apices rounded exteriorly, and having the sutural angle rather acute; their dorsal surface covered, *first*, with very short grayish down, *secondly*, with small, but distinct equidistant punctures, and *thirdly*, with equidistant pustules, which are less numerous than the punctures as one to ten. The legs are simple, the femora having only a moderate incrassation. (Length of the body 1 inch, breadth .325 inch). A common insect something like *Phacodes lentiginosus*, and both are frequently referred to the *Callidium obscurum* of Fabricius; I cannot say with what justice, as that author does not mention one character peculiar to the insects; in fact, his description, brief as it is, will not suit either of them. The query attached above to the name *Callidium* is intended to imply that the insect does not belong to the genus *Callidium* as now restricted.

Callidium ? *vittigerum*. Antennæ not exceeding two-thirds of the length of the body, incrassated towards the tip, black, 11-jointed, the basal joint robust, all the joints except the short second joint of nearly equal length; head black, elongate anteriorly; prothorax rounded laterally, slightly flattened dorsally, much wider than the head, of nearly equal length and width, covered with confluent punctures, black, with four white pilose longitudinal vittæ, two, dorsal and distant, and two, lateral: elytra, slightly wider than prothorax, rounded at apex, slightly produced at the shoulders, testaceous, with a white pilose subsutural vitta on each, extending throughout its length; legs short, simple, ferruginous. (Length .45 inch, breadth .125 inch). A single specimen only occurs in Mr. Ince's collection.

Lagocheirus Inceii. Of a rich velvety brown colour, variegated with a few markings, the most conspicuous of which is an abbreviated whitish fascia on each elytron, commencing on the costal margin below the shoulder, extending on to the back, and terminating much before the suture; below this, on each elytron, is a dark fuscous macula. (Length of the body $\frac{1}{2}$ inch, breadth 2 inches). This, too closely resembles a common Brazilian species, and is the first example I have seen from Australia. Can there be any mistake as to the country? I have the pleasure of dedicating this species to Captain Ince, at the request of his brother, W. H. Ince, Esq., to whose kindness I am indebted for the opportunity of describing these insects. A single specimen only was procured.

Monohammus vastator. Entirely dark brown, approaching to black, the dorsal surface of the prothorax and elytra being clothed with a short gray pubescence: this pubescence has a mottled appearance, occasioned by the presence of glabrous spots or patches, but as it appears the pubescence is very easily abraded, I cannot venture to decide whether the glabrous markings are natural or caused by casualties. The antennæ are very long in the male, exceeding by one-half the length of the body; the protibiæ have a very distinct tooth near the extremity. A number of specimens were taken, some of them very fine, and the males appear to be much larger than the females. (Length of the body 1.2 inches, breadth .4 inch; expansion of the antennæ $5\frac{1}{2}$ inches.—*Edward Newman*.)

Capture of the Migratory Locust at Yarmouth.—During the months of August and September a great number of these insects were taken; one gentlemen took fifteen, and three times as many have been captured by different persons. I have myself

obtained ten from the people who are constantly employed on the denes.—*George Fitt, Jun.*

Occurrence of the Locust in Devonshire.—Mrs. Griffiths has in her possession a fine specimen of *Gryllus migratorius*, which was captured at Exmouth the latter end of September, by her grandson, when his schoolfellow succeeded in taking four or five of the same species.—*Torquay, Nov. 9th, 1846.*

Capture of the Locust near Manchester.—If you have had no communication on the subject from the neighbourhood of Manchester, perhaps you would like to know that one specimen at least of *Gryllus migratorius* has been found here; I obtained it alive on the 4th of September from some boys who had just knocked it down in a small drying-ground in Coupland-street, Green Keys.—*John S. Ashworth; Hyde, near Manchester, Oct. 3rd, 1846.*

Occurrence of the Locust near Hull.—Having had an opportunity of noticing a few facts with regard to the migration of the *Gryllus migratorius* in this part of the country, I thought that you might like to know them, and have therefore taken the liberty of addressing this letter to you, which I beg you will make what use of you choose. September seems to be a favourite month for the visit of locusts to the British Isles, as the following extracts from some of the newspapers which have fallen under my observation will prove. Last year the 'Hull Packet' of September 11th contains this paragraph: "*Locusts.*—A very good specimen of the *Locusta migratoria* is in the possession of a gentleman at Sigglesthorne, where it was taken on Wednesday, in a field of Mr. Richardson's, and several others have been caught in that neighbourhood within the past week." The 'Mark Lane Express' of September 14th: "*The Egyptian Locust.*—A male specimen of this remarkable insect, *Acrydium migratorium*, was last week deposited in the Museum of the Philosophical Society at Leicester: in circumference it measured $2\frac{1}{2}$ inches, and from the tip of one wing to the other, when expanded, $3\frac{3}{4}$ inches." The 'Hull Packet' again, of September 25th: "*Locusts.*—We recently noticed the capture, at Sigglesthorne, of a solitary insect of this tribe; subsequently the whole coast between the Humber and the Tweed has been more or less subject to inroads by myriads of locusts, apparently bending a course towards the south. A few days ago a cloud of the creatures settled temporarily near Spurn Point, and about the same time several stragglers were taken alive at Cleethorpes, (a sea-bathing place, at the entrance of the Humber, and nearly opposite to Spurn Point), where bottled locusts are now exhibited, feeding upon herbage, for the gratification of the visitors." The 'Mark Lane Express' a second time, even as late as the 12th of October, mentions these insects. The 'Stirling Observer' shows "that there have been flights of Egyptian locusts in different parts of Scotland; one of these locusts has been preserved alive in the Edinburgh Zoological Gardens." The earliest appearance of this destructive creature of which I have seen notice taken occurs in the 'Hull Packet' of August 21st, extracted from the 'Newcastle Journal,' also in the last year. "*Unwelcome Strangers.*—A large flight of locusts passed over the town of Sunderland on Monday evening last. They hovered over the neighbourhood of Hendon, and numbers alighted on the hedges there, till on a crowd beginning to collect, they took flight towards the south. They appeared to conduct their migration in close company. Several of them were caught." On the 8th of last September a labouring man brought me a fine specimen of this insect, which he had caught in one of our own fields; I immediately destroyed it, and have it now in my possession in beautiful preservation; and on the 10th of the same month a lady brought me three of them alive

in a bottle. I placed them in a box, where they could have more room and freer access to the air, and supplied them with plenty of green food, but, from their previous confinement, they seemed to have suffered so much, that I thought it better to destroy them about ten days after, fearing they would otherwise be injured as specimens; one, which has a considerable quantity of green in its colour, is now in the British Museum: these three were taken close to Easington, a village on the Yorkshire coast, about five miles from Spurn Point. I was at the latter place on the 29th of September, 1846, and from the quantity of dead specimens which the inhabitants had kept, as well as the account they gave me, found that the newspapers had by no means exaggerated the numbers in which these insects had appeared.—*William Sherwood; Rysome Garth, Patrington, Hull.*

P.S. I omitted noticing that one of the three locusts which I had in the box deposited several eggs in a large cluster, which is now in the British Museum.—*W. S., March 9th, 1847.*

The Caterpillar of Sphinx Convolvuli.—In August, 1814, I was reaping wheat in a field, in the parish of Tibberton, Worcestershire, about five miles from Worcester, and in that part of the field there was growing with the wheat a quantity of the plant *Convolvulus arvensis*, amongst which I found two of the caterpillars of *S. Convolvuli*, full-grown; I explained to the men that were reaping at the same time, that the caterpillars would produce two beautiful moths; unfortunately for me I had no box to put them in, I attempted to secure them, but at night both escaped.—*Richard Weaver; 152, Bromsgrove Street, Birmingham, March 4th, 1847.*

Capture of Dictyonota crassicornis on the coast of Suffolk.—During an entomological visit to Lowestoft, last June, my attention was attracted by the profuse appearance of a little hemipterous insect, which turned out, on after examination, to be the *Dictyonota crassicornis* of Curtis. My object being principally to investigate the species of *Dyschirius*, and trace out their habitats, it was my chief amusement to spend the hottest parts of the day on the beach, and examine the hollow ridges at the base of the cliffs and the small pits formed in the dry parts of the sand. These casual excavations formed traps for a large quantity of insects, which, unlike the *Dyschirii*, had not sufficient strength to bear up against the strong gusts of wind which occasionally swept over the sand, and carried everything which was superfluous from off its even surface. If, therefore, such insects as *Harpali* and *Ægialie* were oftentimes unable (as was the case) to retain their positions, it is easy to understand why creatures so frail and comparatively helpless as the Hemiptera should be wafted wholesale into the pits. And such was the fact; for every hole and hollow ridge on the beach to the south of the town was positively teeming with the beautiful *Dictyonotæ*, hundreds of which might be seen lying on their backs, wafted from off the sand. Mr. Dallas informs me that he has taken them at Brighton from the grass facing the sea, but I have never before heard of their occurrence in such profusion as at Lowestoft.—*T. V. Wolleston; Jesus College, Cambridge, Dec. 18th, 1846.*

Anomalous appearance of Insects.—The winter of 1845-6 was particularly mild, so much so, that on the 20th of January I obtained a caterpillar of *P. Brassicæ* which was feeding on brocoli: in a few days afterwards it became a pupa, and emerged on the 15th of the following May. The mild winter was succeeded by an unusually hot summer, and (from the many interesting communications in the 'Zoologist') it would appear that one or both of these circumstances were favorable for maturing many Lepidoptera which are of rare occurrence. Nor shall I be surprised if the com-

ing season exhibit much irregularity in the time of appearance of many insects, if one may infer anything from the following particulars: of a brood of *A. aversata* three passed through the intermediate, and appeared in the perfect state in September, while the rest remain of the size in which they usually pass the winter: of a brood of *M. Brassicæ* which went down in July, six emerged in September; the rest, I suppose, will appear this spring. In the same way three larvæ of *A. Caja* outstripped the rest of the brood and came out early in November; the others are about half an inch long. A single larva of a brood of *G. bella* grew rapidly, and the perfect insect appeared on the 1st of October; the rest are about one-third grown; and of a brood of *C. Alcines*, six or seven were full-grown in October, but have not yet emerged, while the remainder are not more than half an inch long. I am quite aware of the objection, that these are instances of larvæ bred in confinement, and therefore we cannot argue from them to such as are at liberty; and this is true to a certain extent. But if such anomalies have not occurred with larvæ in confinement before, (and they have not to me), there is surely a *probability* that similar anomalies may have occurred amongst those in a natural state; and I think there must have been such, for I took an example of *L. impura* on the 5th of September, and another on the 12th, both apparently just emerged from the chrysalis. I had two or three larvæ of *A. urticæ* (from eggs deposited in June) which were full-fed about the middle of July; these are still in the pupa state. but on the 10th of October I found four larvæ of the same species about two-thirds grown, which must, I think, have come from eggs deposited by a moth from the July brood of larvæ. Again, late in September, I found some small larvæ of *P. meticulosa*, which continued to feed, and appeared in the winged state about the middle of November: now these must have been part of a brood of those which usually hibernate in the larva state. About the same time I met with a larva of *P. Gamma*, which fed and produced a moth on the 8th of November. This again, must, I think, have been one of those which usually pass the winter in the larva state, if any do, and this I think probable, for *P. percontationis* and *P. Iota* certainly do. These circumstances make it probable that part of the broods, which in ordinary seasons would have appeared this spring, did in reality appear last autumn; and supposing them to have been prolific, there will be nothing wonderful if several moths, in the ensuing season, are irregular in their appearance, and *seem* double-brooded. It is not from an idea that these remarks will be of general interest that I have made them, but to induce others to record (if the Editor will permit) similar anomalies in the pages of the 'Zoologist.'—*William Turner, M.A. ; Uppingham, March 3rd, 1847.*

On the Feeling of Insects.—With regard to the feeling of insects, as much as been said, and much may be said, on both sides, I would only beg to add that I think there can be no doubt that whatever opinion any may form or have formed on the subject, it will be the best and safest way for all to act on the supposition that they have some, if not a very high degree of feeling, and accordingly to make it an unailing rule to kill them as instantaneously as possible.—*F. O. Morris; Nafferton Vicarage, Driffield, January 19th, 1847.*

[I heartily join with the Rev. Mr. Morris in this recommendation, extending it even to the hot-bottle and hot-plate experiments of gentlemen who advocate an opposite view to my own.—*Edward Newman*].

A PROPOSED ACT OF PARLIAMENT FOR THE REMOVAL OF CERTAIN VULGAR PREJUDICES AND ABUSES RELATIVE TO THE SUPPOSED CRUELTY EXERCISED TOWARDS THE INFERIOR ANIMALS. (*Published in the 'VENTNOR DIAMOND,' No. I.*)

"WHEREAS it hath been the custom for certain individuals to publish "books in order to induce children and others to treat animals tenderly, on "the supposition that they are sensible to pain and suffering: And whereas, "it has been proved by certain scientific persons, in a monthly periodical, "called '*THE ZOOLOGIST*,' that insects in particular are incapable of feeling "any pain whatever. BE IT HEREBY ENACTED, that as such works tend to "propagate a falsehood and induce the tender minds of the rising generation "to believe in what does not exist, it shall not be lawful to print and publish "such works; and all persons so printing and publishing them shall be liable "to an action for misdemeanor.

Whereas neither the '*Zoologist*,' nor any correspondent thereof, has advocated the doctrine italicised by the '*Ventnor Diamond*,' neither the Editor nor contributors feel called on to defend such doctrine.

"AND WHEREAS in the dramas of one WILL. SHAKSPERE it is stated "that beetles, in particular, experience as great a degree of inconvenience and "pain in being trod upon, as a full-grown giant would do under similar circumstances, all printers and publishers shall be obliged to omit such passage in any future editions of the dramas of the said Will. Shakspeare, or "passages of like import in future editions of any other works, the same being "false; seeing it has been reasonably and logically proved by said learned "persons in said '*Zoologist*,' that insects are incapable of suffering pain—and "all printers and publishers neglecting to omit such passages shall likewise "be liable to an action for misdemeanor.

Whereas Will. Shakspeare was a poet and not a man of science, his opinion is not admissible on either side; but whereas Will. Shakspeare's evidence, if taken entire, is against the '*Ventnor Diamond*,' we opine that the Diamond is wrong in citing him. In the sacred volume we find this passage, "There is no God," but it is preceded by these words, "The fool hath said in his heart." So Will. Shakspeare's remark on the subject has a true meaning, although by cutting off the commencement it conveys a false one.

"AND WHEREAS it hath been the custom of children to pull the wings off "from flies—the legs off daddy-long-legs, and especially to procure a certain "insect called a cockchaffer, and having run a pin through it, to set it spinning "on a table, or bench, or other suitable smooth surface, whereby it will fizz "round like a teetotum in a manner pleasing to behold—AND WHEREAS certain tender-hearted parents have been in the habit of scolding, cuffing, flogging, pinching the ears of, pulling the hair of, slapping, or otherwise chastising and incommoding said children, on the plea of their being guilty of "supposed cruelty, whereby much joyousness is prevented: Be it hereby Enacted, that, since it has been decided by the aforesaid learned persons, that "such things as cockchaffers have no feeling, it shall not be lawful for such "parents or others to punish, cuff, flog, pinch, pull hair, or otherwise incommode

“mode said children for so doing, but it shall be lawful for said children to stick pins through said cockchaffers, or other insects, and let them fizz round at any, and at all times, when disposed, except at church, during the hours of divine service, if said children shall be at church, without let or impediment; PROVIDED ALWAYS, that nothing herein contained shall prevent parents from punishing children for any other fault by them committed.

Whereas charges of mirthful cruelty to insects are here made against those who doubt their excessive sensibility, the ‘Ventnor Diamond’ is reminded that the only instance of merry-making at the sufferings of insects occurs from the pen of one of his partizans,—the *hot-plate experiment* to wit.

“AND WHEREAS it hath also been the custom of boys at school to procure a certain creature, called a *toad*, and having obtained a short piece of board and a stout stick, to balance said board on a gate, or post, or rail, or other suitable support—and having seated the toad on one end of said board, to strike the other end smartly with said stick, whereby the creature is tossed high up into the air, and falling down with a smash, causes great delight to the spectators; And Whereas, it hath been the custom of their masters or tutors to punish said boys for so doing on the plea of cruelty to said animals, whereby much pleasing and enlivening amusement is prevented: Be it hereby Enacted, that it shall not be lawful for masters and tutors to punish their scholars on any such plea, seeing that such creatures have no feeling of pain from such treatment: Provided always that nothing herein contained shall preclude masters from punishing scholars for any other misdemeanors by them committed.

Whereas Cuvier and other zoologists of eminence do not consider the toad to be an insect, we recommend the ‘Ventnor Diamond’ to withdraw that animal from the argument.

“AND WHEREAS much distress exists in various parts of the country, very often for want of employment; Be it further Enacted, that it shall be lawful for persons during the coming season, to procure a supply of said toads and cockchaffers and such like, with suitable pins, boards and sticks, which they may dispose of, to purchasers for the above-named purposes, which may aid them in obtaining an honest livelihood. And lastly, BE IT ENACTED, that this Act shall extend over the *Whole World*!

“DELTA.

“*Ventnor, Isle of Wight,*

“*March 1st, 1847.*”

And Whereas Mr. Edward Doubleday, an entomologist of great eminence, formerly adopted the signature of “Delta,” and rendered the said signature illustrious by his talents, the said Edward Doubleday suffers grievous wrong and injury by the issuing of such documents as the above bearing the same signature.

Given under our hands this 18th day of March, 1847.

EDWARD NEWMAN.

Antipathy of a Monkey to a Tortoise.—I beg to offer for insertion in your magazine the following observation on a particular antipathy manifested by a small Chinese monkey which I had lately in my possession. I happened to have at the same time a tortoise, and whenever I brought it near the monkey, the latter always exhibited the greatest horror, trembling from head to foot, and going into violent convulsions until the obnoxious animal was removed. I never saw it show the least antipathy to any other animal; but on the contrary, it showed the greatest partiality to dogs and birds.—*Edward Peacock; Bottesford Moors, Brigg, Lincolnshire, February 18th, 1847.*

Anecdote of a Cat.—A cat belonging to the Rev. Mr. De Brett, of Broughton, near Brigg, was generally in the stable with the horses, and often sat upon their backs: it happened that Mr. De Brett was going to visit his friends in Kent, and sent his horses forward into that county by the groom: on the day of departure the cat jumped upon the back of one of them; the groom, thinking it would jump off again, let it proceed, and in fact, it rode to London in this way, and through the streets of London, to Mr. De Brett's mother's residence in Kent: at the several inns where the groom stopped the cat was put into the bar, and always appeared happy and contented.—*Henry Granther; Scauby Brigg, Feb. 11th, 1847.*

A tame Badger.—A little more than two years ago, some men of this place caught in a wood, at night, a young badger, apparently about four months old. In a short time he began to feed heartily, and ultimately became very familiar and playsome. He was called "Bobby," and answered to his name as readily as a dog. With the dogs kept in the same house he always lived on excellent terms, playing and frisking with them, both in and out of doors. He was frequently taking short jaunts, in company with the dogs, to a garden about a quarter of a mile from the village, and although occasionally frightened by the stage-coach passing him, he only once attempted an escape. He seemed rather afraid of strangers, and on being taken much notice of always made his way up the body of his protector, clinging by his long claws to the dress, and hiding his head under the flap of the coat. He manifested great antipathy to strange dogs, and fought with all the vigour and obstinacy of his kind, becoming at such times wonderfully excited, his hair standing erect. He was fed chiefly on milk, bread, and fine bran, but he readily ate birds and rats. He grew rapidly, and became very fat, and at his death, which took place about two months ago (of inflammation of the lungs) he weighed thirty pounds.—*J. N. Beadles; Broadway, Worcestershire, March 3rd, 1847.*

Description of the Calcareous Tuffa, &c., in reference to the Giant Deer.—I once more take the liberty of addressing you on the giant deer of Ireland, a subject which you have so ably brought before the British public, that it has absorbed all other conversation on Natural History at our Societies. I will first say a few words on the formation which has been called "calcareous tuffa," as distinguished from marl. Marl occurs in a solid bed, and has no appearance of stratification; neither does it contain extraneous matter: it is of a clammy or adhesive nature, is free from all admixture of acids or salts, and never hardens to the degree of crystallization. Calcareous tuffa is daily in process of formation, and occurs wherever infiltration of water can take place through the cavities and fissures of our calcareous rocks: it possesses many remarkable qualities, among which may be mentioned the extraordinary rapidity with which it becomes hardened or crystalized on exposure to the atmosphere. Not only in Ireland, but in England, are many well-

known localities where this curious substance is in process of formation : in some of these it assumes the appearance of beautiful white coral ; in others, as at the celebrated Nesbury well, in Yorkshire, lawyers' wigs, bird's-nests with eggs, and numerous other articles, are immersed in the water purposely to obtain an incrustation of the substance in question. Coming nearer home, there is a water-tank at Kingstown, near Dublin, which was excavated as a quarry. The natural fissures of the rock run towards the sea-shore, and this tank receives its share of the water which infiltrates through the fissures, carrying with it acids, metals and fragments of vegetables. Pebble-stones, branches of trees, or small vessels immersed in this tank, very speedily receive a coating of the tuffa, which, if the articles are dried in the sunshine, soon assumes all the hardness of mountain limestone : indeed so extraordinary is the rapidity with which the tuffa is deposited, that the tank would shortly be filled with it were it not frequently cleaned out. There is another locality for this deposit near Kingstown, at the back of Killiney Hill, where are several borings into the rock, made in search of lead : the roofs and sides of these borings are beautifully covered with stalactites formed of this substance : near the same place, in a water-drip descending from Killiney towards the sea-shore, the substance is carried down by the water to the sea-shore and crosses a sandy space of about a hundred yards in length and thirty or forty in width, and this comes in contact with the sea-beach, which is there composed of small fragments of granite, flint, lime, and other stones ; all of which are cemented into a kind of conglomerate by the tuffa, and are used by a variety of polypes for the purpose of habitations : these are tubes of an hexagonal form, and are surmounted by a thimble-shaped mouth or opening. Wherever Mr. Nolan and myself have examined any considerable deposit of the tuffa, we have invariably found it regularly interrupted by layers of vegetable matter carried down by winter floods and heavy rains. On no occasion did we find in this deposit a single sea-shell or fossil-shell of any kind, neither any fossilized wood or fossil bones ; but specimens of *Helix nemoralis*, *H. hortensis*, and a few other land-shells, and several fresh-water species, are not uncommonly found, and in company with these shells occur the bones of the giant deer. Now it appears to me, that Mr. Owen has been led astray by his Dublin informant as to the formation in which the remains of the deer are found ; and I can truly say, that neither Mr. Owen himself, nor his informant, nor any other person, has had the opportunity of being present at the taking up of so many bones of the giant deer as myself. I am, therefore, able to correct him in many particulars : had he ever witnessed the taking up of a skeleton of this animal, he never would have stated that the skeleton in the Royal Dublin Society's Museum was a perfect one, for it wants no less than forty bones, and nine of the caudal vertebræ are made of *papier maché*, and the animal is thus provided with a fine long wagging tail, which Mr. Owen has faithfully copied in his work on Fossil Mammalia : in point of fact, the animal never had any tail at all, as I am able to demonstrate beyond fear, of contradiction. The skeletons which Mr. Owen examined were made up of the largest bones found in the bone-holes, and these as often belonged to horses and cows as to the giant deer. In reference to the accounts of so many bones of this animal occurring in England and on the continent, may I be allowed to inquire what has become of the very large quantities of bones, skulls, and horns, sold by Mr. Nolan and myself during the last forty years, to English, Scotch, French, and German dealers ? it would be most amusing to trace them to their final destination. I recollect a very curious looking foreigner, who called himself Dr. Peppercorn, coming here about twenty years ago ; he represented himself as being

employed by a continental government, and managed to coax a head and horns out of ——— and another out of ———, on condition of conferring titles on the donors. He made a similar overture to Mr. Thomas Warren, of Blessington, but this gentleman was not to be taken in with gilt gingerbread, and remains plain Esquire to this day. Again, a man of the name of Crampton, a mineral dealer, took away two cart-loads of these bones to the Isle of Man, Scotland, and England, and sold or exchanged them as he best could.—*Richard Glennon ; Dublin.*

Further particulars of the Giant Deer of Ireland.—I have obtained a quantity of information relative to the remains of the animal in question, and am promised still more from various quarters. Hitherto, everything appears calculated to bear out my views, in the strongest manner, and indeed, I cannot see anything that could now shake the evidence I have collected. In a letter I have received from Mr. Benn, of Ballymena, occur the following passages:—"In the collection of the late Mr. Johnston, of Down, which had been left by his uncle, an attorney, and in which everything was labelled with the accuracy and precision of that profession, is a small brass spear, with a piece of wood still in the socket, with a label, stating it to have been found in a marl pit, among the bones of a deer." "An excise-officer told me that he saw, found in a marl-pit, at a place called Mentrym in Meath, bordering on Louth, the skeleton of a deer and man, and a long knife,—what he called a long knife, is, I believe, a short iron sword, now, I think, in the collection of Mr. Petrie, of Dublin, who told me that some such tradition had accompanied it into his possession." "I now come to state my impressions as to the causes of these facts; and the theory I have formed on the subject is,—that the animal lived in recent times,—that he was hunted and exterminated for food,—that the mode of hunting him was to chase and terrify him into pools and swamps, such as the marl-pits then were,—that the head was then cut off, as of little value, and very difficult to drag out,—that the under jaw and tongue were cut off, sometimes they were obliged to leave part of the neck, and sometimes a leg." In Doctor Mantell's 'Wonders of Geology,' p. 110, it is stated, while treating of the Great Deer, that Professor Jameson, Mr. Weaver, and others, have clearly proved that this majestic creature was coeval with man,—that a skull was found in Germany, associated with stone hatchets and urns,—that in the county of Cork, a human body was exhumed from a wet and marshy soil, beneath a bed of peat, eleven feet thick; the body was in good preservation, and enveloped in a deer-skin covered with hair,—that in Jameson's Cuvier, that eminent zoologist states a rib to have been found, injured in such a manner as would lead to the supposition of the wound having been inflicted by an arrow: and Dr. Mantell concludes,—"There is therefore presumptive evidence that the race was extirpated by the hunter tribes who first took possession of these islands." Dr. Mantell refers also to confirmatory opinions expressed by Mr. Charles Lyell, President of the Geological Society of London, in an address, delivered by him in 1837: as also collateral evidence adduced by Dr. Scouler of Dublin, as resulting from certain geological features of the places where the remains have been found. Dr. Martin informs me that on the banks of the river Suir, near Portland, in the county of Waterford, and on nearly every farm, are found, near springs, spaces of frequently seventy feet in diameter, consisting of stones, broken up as for roads, and lying together in a mass. These stones were evidently purposely broken, and all much of the one size, and are charred. These spaces are many feet in depth. The tradition respecting them, current among the peasantry, is, that here in olden time, a *great deer* was killed and *baked* in these stone-pits, the stones having been previously heated like

a kiln, and they also distinguish the animal as "The Irish Elk." These places are called in Irish by a name, signifying the "*Buck's Den*."—*H. D. Richardson; Dublin.*

Discovery of Bones near Saltcoats, Ayrshire.—I have read the interesting account you gave in the preface to the 'Zoologist' of the discovery made by Messrs. Glennon and Nolan of Dublin. It reminded me of a somewhat similar, but much less interesting discovery, made by me about seven years ago, for among the bones, &c., found, there were no traces of the Irish giant deer, though part of the remains of many stately deer were found among the buried bones. As a school was much needed in that part of the town of Saltcoats which was within my parish, and too distant from the parish-school of Stevington, I had succeeded in getting a handsome sum subscribed, and a grant from the treasury, and ground from the Earl of Eglintoun and another proprietor, and we forthwith began to level the ground for the new edifice. The spot of ground which we had got, was a little eminence called Kyle's Hill or Coil's Hill, in the outskirts of Saltcoats. It had lain waste for a long time, and had been the lounging place of idlers on sunny days, and often the resort of sailors' wives and sweethearts, from the commanding view it gave in the distance of homeward-bound vessels. It was the habitat of a few rather rare plants, one of which was *Hyoseyamus niger*. As I had discovered a deposit of post-tertiary shells at no great distance, I gave strict charges to the person who was employed to level this ground and dig for a good foundation, to be on the outlook for shells or anything curious, and to let me know what was found. As the Manse was at some distance, I could pay only occasional visits. Passing one day when they were digging, I was surprised to see part of the antler of a red deer turned up. When the person to whom I had given strict charges saw that I regarded it with interest, he said that if he had known that I would have cared for these things he could have got me a *hundred* of them. I asked what had become of them. He said, that they had been mixed with at least a cart-load of bones, and that the children who gathered them had sold bones and horns to a person who was purchasing bones for manure. Expressing my regret that they had thus been lost, I told him, that if any more bones or horns were found, he might send the children with them to me, and I would give a higher price than the bone-gatherer. Though the greater part had been disposed of, I succeeded in this manner in getting a few stumps of the antlers of the red deer, only two of which, with six fragments of branches, are now in my possession. The largest of these must, at one time, have adorned the head of a noble animal, for it measures eight inches in circumference at the base. I got a considerable collection of bones, which I wished to submit to some person skilled in comparative anatomy, but not falling in with any *savant* of this description, they have been lost. All that I have retained is a parcel of teeth, all, it is probable, of domesticated animals. I shall send you some of them, and I shall be glad to learn what they are. There was the skull of a hare, and the skull, I think, of a red deer, or perhaps of a smaller species, for it was not of a size corresponding to the fragments of horn that I got. There is a part of a jawbone, containing six stout teeth, one of which I shall send you. They are all striated in the inner side, a circumstance which may be common, but I had not before observed it. A hundred stumps of the horns of *Cervus Elaphus*, found buried in one place, points out a state of the country very different from the present. There is not now one of these stately animals in a wild state in the whole county of Ayr. It is a remarkable circumstance that, as in the case of the gigantic deers' horns found in Ireland, many of the horns found here were sawn through six or seven inches from the base. If the Irish deer

were domesticated like cows, and occasionally brought to the slaughter-house to be killed for food, then it might be convenient to saw off the horns, lest they should intercept the death-stroke when armed at the forehead. But there is nothing in history or in tradition that leads us to think that the red deer were ever domesticated; and when they met with death, it would not be by the murderous blow of the hammer, but by the cruel teeth of dogs, or by the winged arrows of the huntsman. But bones and horns were not the only remains; there were masses of shells, generally of the edible mollusks; there was also what seemed a fragment of the *quern* or old hand-mill. There was likewise the iron head of a spear, very much eaten away by rust, but which may have done service in the tournament or in the field of battle. The greatest curiosity, however, was a very antique-looking bead, of considerable size, with longitudinal grooves; it was of a blue colour, and, I think, of glass, though mixed with something that gave it the appearance of *lapis-lazuli*. It resembled those described by Ure, in his 'History of Rutherglen,' which in olden times were used as amulets, and were thought to have come from Phœnicia. These various things were found at the depth of about three feet. Near to them, and at about the same depth, there was found a great mass of wood or peat ashes. This corresponded with the tradition, that Coil's Hill was one of the eminences on which beacon or telegraphic fires were kindled to spread alarm on the approach of an enemy. Old Time has spread a dark veil over the history of this hill, and we despair of being able to lift it up. He may laugh also at the following conjecture. It is known that there was a King Coilus or Coil, who was renowned in the west. A large portion of Ayrshire bears his name—the district of Kyle. Within that district there is a fine estate called Coils-field. The tradition is, that it was so called, because King Coil was there slain in battle, and there buried, at a place marked by a monumental stone. The correctness of this tradition has been tested. The ground was lately dug up around this stone, and at some considerable depth an urn was found, containing a little black earth—the remains, it is possible, of King Coilus. There is in the same district a rivulet called Kyle. There is at Kilwinning a well, called Kyle's well, and four miles distant, near Saltcoats, there is, as we have seen, Kyle's hill, where the antiquities we have mentioned were found. If any should think that *Coile* and *Kyle* are very different, I may mention, that according to the Ayrshire pronunciation they have the same sound, as *oi* in the word *oil* has the same sound, as *œi* in the French word *l'œil*, 'the eye.' When Ayrshire, then, was covered with wood, and when hundreds of red deer sported in the green-wood glades, it is possible that King Coil had a hunting-lodge on Coil's hill. If you have a better explanation or conjecture, I shall be glad to hear it.—*D. Landsborough; Rockvale, Saltcoats, March 7th, 1847.*

[The teeth sent by the Rev. Mr. Landsborough, are—1 molar (upper-jaw) of a very small horse, 2 molars of a pig, 5 molars of a deer, probably the red deer, and 1 incisor, probably the red deer.—*Edward Newman*].

Buffalo-battues.—"Soon we came to where the ground was strewed over with countless bleached skeletons of buffaloes. The poor improvident Indians, when they meet with powerful herds of these animals, and have a favourable opportunity of destroying them, kill as many as they can, frequently several hundreds in a day, and all for the sake of the skins, with which they liquidate their debts to the insatiate trader, leaving the carcasses to rot on the ground, and afford food to the prairie-wolves. This had been the scene of one of these buffalo-battues. At some future geological period, when another deposit is made on this part of the terrestrial surface, it may be that these

remains may be discovered, and produce theories and conjectures as to the cause of the destruction that will greatly interest mankind, or whatever kind may then exist, until some Buckland *redivivus*, finding the barb of an arrow in the rib of one of them, will, with the same power of genius and fancy that once illuminated the obscurities of the Kirkdale cave, people these prairies over again with butchering Indians and flying buffaloes. It was impossible to ride amongst these skeletons without thinking of the condition of the Indians, who are now paying for their folly in unprofitably destroying and frightening the buffaloes away, by having now to perform the most tedious journeys in the winter, to procure meat for the subsistence of their families.”—*Featherstonhaugh’s Canoe Voyage*.

Habits of the Antelope.—“Whilst I was waiting the arrival of the *charette*, I was exceedingly amused with the movements of one of those antelopes which rove over these prairies. The graceful creature came bounding on, in a singularly elastic manner, towards the place where the mare was browsing, and where I was lying on the grass. Sometimes it reared itself up on its hind-legs to get a good look at us, and then, if I lifted up my head, would wheel round and fly away with surprising speed; then again it would return and repeat its elegant motions. These beautiful creatures often become the victims of their curiosity; for when the hunter conceals himself behind a knoll, and waves a piece of cloth tied to a stick, so insatiable is their propensity, that they frequently approach too near for their own safety. This antelope, and some flocks of brown plover, were the only animals I saw during this ride.”—*Id.*

Prairie Dogs.—“At 3 p.m., we stopped for the men to dine at a slope on the right bank, up which I ascended, and after struggling for one hundred yards through the matted bushes, entangled with wild peas and vines, I reached the top, and found a very spacious prairie, thrown up into myriads of hills, made by what have been called prairie dogs. These little interesting animals have been called so probably from the indistinct sort of barking they make, for they have no resemblance to dogs, either in their appearance or habits. In size they are like a large rat, about ten inches long, with a reddish-green fur, and sit upon their hind legs, like a squirrel, on the top of the hillocks they have thrown up; from whence, on the approach of danger, they quickly retreat into their burrows. They are short-legged, and have sharp crooked nails to their anterior feet, for the purpose of burrowing. Nature has curiously provided them with deep pouches, opening externally from their cheeks, and enlarging the sides of the head and neck. The first specimen which was produced had these pouches turned inside out, as though the animal had a bag on each side of the head, and in this odd manner it is figured in the ‘*Linneæan Transactions*,’ and in Shaw, vol. ii., *Raffinesque* gave it the elegant name of *Geomys*, and Shaw, of *Mus bursarius*.”—*Id.*

The Musk-Rat.—“September 24th. This being the season for musk-rats, as the traders call them, they (the Indians) had taken an immense number of them, which they had skinned, and the carcasses, which they are very fond of, were drying on sticks over a slow fire. In twenty days they had taken 1200 of these animals. Some of the traders at *Prairie du Chien* told me that these creatures increase in number now that the foxes and other animals are diminishing. The *sinkepay*, as the *Nacotahs* call the muskquash, or musk-rat of the traders, is much larger than the common rat; it has a reddish-gray fur, resembling that of the beaver, and in common with that animal constructs itself a conical mud house, where the situation admits of it, above the surface of any body of water, where a root grows, which it subsists on during the winter,

and to which it has access by a hole in the bottom. I have occasionally seen skins of this animal of a fawn colour. Besides this famous supply of musk-rats they had a large pile of wild ducks and teal which they had shot, together with a fine heron. All the Indians looked strong and hearty, in consequence of the abundance of animal food at this season of the year. He informed me that the Côteau du Prairie was a beautiful upland country, containing an immense number of small lakes, some of which contained well-wooded islands, where the Indians in the season took great quantities of musk-rats. These animals, he assured me, sometimes migrate, and are often met at such times on the prairies in incredible numbers. I have very little doubt of the truth of his statement, for all the American animals, both large and small, possess—what is most probably an acquired intelligence—the sense of bettering their condition by emigrating from districts where their food is becoming scarce. I remember, when in the Indian country in Upper Canada in 1807, meeting with the most surprising quantities of fine glossy black-skinned squirrels, with singularly beautiful bushy tails; they had spread over an immense district of country, and were evidently advancing from Lake Huron to the south.”—*Id.*

Habits of the Squirrel.—A few years since, when the Rev. Francis Faithfull, of Hatfield, Herts, was staying with me, we were driving out in a gig, between this village and Broughton, an adjoining parish, and observing some animal, apparently strange, crossing the road which separates two plantations, we pulled up to satisfy ourselves, when we found to our surprise that it was an old squirrel conveying its young: it appeared to hold the neck of the young one in its mouth, while the body seemed to be wrapped round the neck of the mother like a boa tippet. An instance of the migration of squirrels from one district to another was lately witnessed by my son James, and a friend of his, who were fishing in the river Auxholm. They observed a number of these animals come down to the river's bank from a plantation of the Duke of St. Alban's, in the parish of Ribaldstow, and without much hesitation five or six of them leaped into the river, and swam across into the parish of Cadney. No doubt the whole of the flock would have followed, but the young gentlemen, astonished at the sight, ran to the spot, when those not already in the river hastened back to the plantation whence they came.—*Henry Granther; Scawley Brigg, February 11th, 1847.*

A curious mode of Bird-catching.—Baron Votie, a colonel of the Austrian service, was very fond of bird-catching, at which he was a first-rate hand; and as I never heard of his mode in England, and as it may be considered curious by some of my readers, I will describe it. After placing the twigs, he hid himself near the place, and made a loud noise resembling that which is made by an owl when it is caught. The poor little birds, fancying their midnight enemy in trouble or in a trap, flocked in hundreds, not to assist him, but to peck his life out. In this way he would sometimes entrap from fifty to a hundred birds at a sitting, selecting those he wished to keep, and letting the others off.—*Dr. Wilson's 'Practice of Water Cure,' p. 32.*

Note on the Arrival of some of the Summer Birds of Passage at Shooter's Hill, Kent, in the Spring of 1846.

Extremes meet: the bitter winter of 1844-5 was succeeded by the mildest winter known. Throughout Europe the winter was so open, that there may be said to have been no winter in 1845-6. I was, therefore, early on the look out for the return of my musical friends. Hearing that the chiff-chaff had been seen on the 27th of February, I diligently, but ineffectually, sought it till the 11th of March, when my old acquaintance, on the top of Shooter's Hill, announced his arrival as the harbinger of a forward spring. Some woodmen had heard one lower down in the woods about a fortnight earlier. On the 12th, I observed three chiff-chaffs, and on the 27th never noticed them more numerous or noisy. I had for days regularly beat up the haunts of the blackcap, and felt some disappointment at not meeting with him, when on the 28th of March, while pruning a rose-tree at mid-day, I heard the well-known notes of that merry bird. I darted off for my glass, and soon saw our blackcap, in blooming condition, singing away in the highest spirits. I was delighted beyond measure to hear our welcome friend once more. While walking to the stable, at $\frac{1}{2}$ past 7 a.m., and looking at the clouds, I suddenly exclaimed, "What! a swallow? No! it flies like, but cannot be, a martin." A quick turn, however, exposed its white rump, and sure enough there was a house martin on the 1st of April. This morning I heard several blackcaps in full song. On the 3rd of April, as I rode through the brushwood on Shooter's Hill, I observed a little light-coloured bird being driven about by a sturdy stonechat. The little fellow whipped into a bramble-bush, and I instantly heard the joyous song of the gallant little willow-wren. A moment after he was paying his respects to a pair of dicky dunnocks: the bird was all excitement, and scarcely knew what to be at. On the 4th, I met with numbers of willow-wrens on the east of Plumstead Common, and rode with them for some time in their progress westward. This, and other observations, lead me to think, that many of the smaller birds of passage come up the valley of the Thames with the river for their guide. On my arrival home, after my morning's ride on Sunday the 5th, I caught the sound of a martin's twitter, and on looking up there was our house martin, making a figure of 8 round the two blocks of houses, singing and chattering in very gladness of heart. So numerous were the willow-wrens on the 6th, that Shooter's Hill broke forth into singing.

The plumage of all the birds was most splendid this spring. Some of the willow-wrens were almost as bright as canaries, the feathers about the throat being a distinct yellow, shading off into green. On the 8th, the willow-wrens were singing everywhere, and flying at each other most pugnaciously. The nightingale was heard on the 8th by residents on Shooter's Hill. The woodmen stated that they had seen the wryneck and titlark on the 8th, and had heard the nightingale on the 9th. On the 11th, I saw a hen blackcap; and at last met with the nightingale crossing the path in the Castle-woods. I soon heard his croak, and then mounting a tree, he poured forth his unrivalled melody. Right or wrong, I took him to be my broken-legged nightingale: he occupied the same quarters, and sang in the same trees; numbers of traps were again laid for him, but he, gaining wisdom from experience, had learned to withstand the temptation of meal-worms, and escaped them all. As soon as his wife arrived, I caught her and let her fly, so that often through the spring I had the pleasure of hearing the luscious notes of her mate. I was told a nightingale had been heard, another had been caught on the 5th of April. Sunday, the 12th, I heard a tree pipit,

and saw him ascend from one tree and descend to the next. I have two tree pipits, said to have been caught on the 7th; one was shot at Woolwich on the 8th. At the same spot as last year, I this morning heard and saw the lesser whitethroat. In the afternoon, I observed one swallow hovering about Eltham. On Monday, the 13th, I met with meggy whitethroat at the old place. There he was, with his dark smoky head and bright throat, magging as incessantly as ever. I had not watched him long before up he went, jiggling his long tail and singing most happily. On the 15th, I was much gratified at meeting with my especial favourite, the whinchat: the pretty bird, perched on a sprig of furze, his colours modest and beautiful, his form elegant and compact, sang his plaintive and pleasing melody. Saw another swallow on the 23rd, and a cuckoo on the 29th. Met a stray wheatear on Woolwich Common on the 30th. On May the 2nd, heard the melodious song of the garden-warbler. I was more than ever struck with the purity and rich sweetness of its deep, mellow tone: I found him busily engaged among the young birds of the underwood oak. On the 8th of May, at $\frac{1}{2}$ past 5 a.m., saw, with the aid of the glass, three swifts high in the air, making a direct passage north.

1846.	March 11th.	Chiff-chaff.	1846.	April 12th.	Lesser whitethroat.
	„ 28th.	Blackcap.		„ 12th.	Swallow.
	April 1st.	House martin.		„ 13th.	Whitethroat.
	„ 3rd.	Willow-wren.		„ 15th.	Whinchat.
	„ 8th.	Nightingale,	May 2nd.		Garden-warbler.
	„ 12th.	Tree pipit.	„ 8th.		Swift.

—*Matthew Hutchinson; Blackheath, June, 1846.*

Note on the Season of 1846.—In the spring there were comparatively few swallows and martins, though sand-martins were numerous. But on their return passage in the autumn I never observed greater numbers, and I then noticed several *Hirundinidæ* that I could not make out to be either old or young swifts, swallows, or martins. Had not the remarkably warm winter and very early spring induced the summer birds of passage to fly further north than usual? I found whinchats and cuckoos scarce; chiff-chaffs, blackcaps, and garden-warblers unusually numerous. I saw but one red-backed shrike all the season, and not one wood-wren.—*Matthew Hutchinson; Blackheath.*

Ornithological and other Observations, in Norfolk, for the months of January and February, 1847.

January. About the middle of this month, a large white owl, apparently measuring as much as six feet from tip to tip of the wings, was twice seen at Brooke. The attempts made to procure it were unsuccessful, but the above description, the accuracy of which, there is no reason to doubt, makes it probable that the bird was an example of that rare visiter, the snowy owl.

The marsh titmouse has been more than usually abundant in Norfolk during the present winter. These birds are observed to associate with the gold-crest, and, perhaps, like that species, their numbers are increased by migratory arrivals in the months of November and December. It may be observed, that the trivial name *palustris* is badly applied to this species, which, far from being exclusively an inhabitant of marshes, is constantly to be seen in upland and wooded districts.

About the end of January, a female of the ash-coloured shrike was captured at Norfolk, by a gentleman who was seeking goldfinches. Having pounced on one of these latter, the shrike placed one foot on the body of its victim, and was apparently proceed-

ing to drive in its skull with her beak, when the net was drawn, and both birds captured alive and unhurt. In confinement, this shrike feeds upon mice and small birds, which it fixes between the wires of its cage, and then pulls to pieces. Another shrike was observed near the spot, but was not taken. In the act of pouncing on its prey, this bird had much the appearance of a martin.

The quail has again occurred; an example having in this instance been taken near some stacks in the vicinity of Norwich; at the end of January it was still kept alive in a cage.

Several geese were brought to Norwich in the latter part of the month: three of these were adult males; one of which was killed at Hickling, one at Lynn, and one at Upton. One or two specimens of the red-breasted merganser and of the shrew have also occurred, but with the exception of a single adult example of the latter species, we believe that the individuals captured were all in immature plumage. The smew usually occurs at a somewhat later period of the winter than in the month of January.

February. With the exception of the capture of a few specimens of the sanderling on the coast early in this month, some of which had made considerable progress in the attainment of the nuptial plumage, we know of no ornithological occurrence worth recording.

The liver of a hake (*Merlucius vulgaris*) which was lately captured off Sherringham, and measured about $2\frac{1}{2}$ feet in length, was observed to be much infested with parasitic worms; a mass of these animals, which must have amounted to a quarter of a pint, being attached to it. Each worm formed a separate coil of about one-eighth of an inch in diameter; and besides the mass to which we have alluded, many single worms had formed separate nests in various parts of the surface of the liver.

We are informed by Mr. John Smith, of Yarmouth, that the angel-fish (*Squatina angelus*) occurred twice at that place in the course of last year; a young example having been captured in June, and a specimen measuring 4 feet 6 inches in length in August. The latter fish was taken at the sole-grounds, and measured 3 feet 7 inches across the pectoral, and 1 foot 7 inches across the ventral fins. — *J. H. Gurney, William R. Fisher; February, 1847.*

Rare Birds occurring near Bridlington in the Winter of 1846-7.—I learn from Mr. Jones, the bird-preserver, at Bridlington, that the following rare birds have occurred there during the past winter. Several glaucous gulls, in immature plumage; two in adult plumage; one Iceland gull, in immature plumage, shot in the harbour; eight or ten specimens of the little auk; two fine specimens of the male hen harrier; two of the gray-backed shrike; several golden-eyes, smews, one grosbeak, &c. — *F. O. Morris; Nafferton Vicarage, near Driffield, March 20th, 1847.*

Rare Birds occurring near Ipswich.—The following rare birds have been brought me in the flesh:—

Honey-buzzard, shot by E. Candler, Esq., Theberton, Suffolk.

Osprey, shot by J. Howard, Rushmere, Suffolk.

Spotted crane, shot by R. Newson, Ipswich.

Adult spoonbill, shot by F. Fuller, Esq., Aldborough, Suffolk.

Eared grebe, (*Podiceps auritus*), shot by a gamekeeper, Nacton, Suffolk.

Curlew sandpiper, shot by F. Fuller, Esq., Aldborough, July 31st, 1845.

Wood sandpiper (*Totanus glareola*), shot by G. Ransome, Aldborough, August 1st, 1845.

Pair of gray phalaropes, shot by A. Fuller, Esq., Aldborough, October 13th, 1846.

Lesser bustard (*Otis tetrax*), shot by J. Flatt, Esq., Snape, November, 1846.

Great bittern, shot by J. B. Taylor, Walton, December 11th, 1846.

Little auk, shot by W. Chapman, Rushmere, December 18th, 1846.

Quail, ditto ditto ditto.

Bewick's swan (*Cygnus Bewickii*), shot by a fisherman, in Woodbridge River, January 3rd, 1847.

Velvet scoter (*Oidemia fusca*), shot by F. Fuller, Esq., Aldborough.

Puffin, shot by F. Fuller, Esq., Aldborough, January 18th, 1847.—*Geo. Ransome* ; Ipswich, March 19th, 1847.

Dates of Arrival of Migratory Birds at Elveden in the Autumn of 1846.

Golden plover, September 24th	Fieldfare, October 8th
Hooded crow, October 4th	Redwing, „ 9th
Woodcock, „ 5th	Ring-ousel, „ 10th
Crossbill, „ 8th	Siskin, „ 12th.

Since I made the remark on the ring-ousel (*Zool.* 1549), two other examples have been seen at Elden ; the one mentioned here, and one much later. — *Alfred Newton* ; Everton, Biggleswade, March 30th, 1847.

Occurrence of Rare Birds near Thetford in Norfolk, &c.

Sea or White-tailed Eagle. A very fine specimen of this fine bird was shot about a month ago at Stetchworth, near Newmarket, where, I believe, it had been seen some days previously.

Hoopoe. A specimen of this bird was found dead, but quite fresh, on Thetford Warren, in the beginning of December, 1846. I had, hitherto, always believed that this bird was only a summer visitor to Great Britain.

Barred Woodpecker. One was shot in a wood at Barningham, in Suffolk, in January, 1847.

Gray Phalarope. Shot at Wretham, in Norfolk.

Bittern. Two specimens were killed towards the end of December, 1846 ; one at Icklingham, in Suffolk, the other at Brandon. I was also informed, by Mr. Charles Lloyd, of Reading, that one was killed at, or near that place, last January.

Spotted Crake. A bird of this species was picked up dead at Thetford, by the side of the Northern and Eastern Railway. I suppose it had been killed by flying against the wires of the electric telegraph, as one wing was broken, and the head bared of a considerable quantity of feathers. This was last October.

Golden-eyed Duck. An immature individual was obtained near Thetford about the middle of February last.

Smew. Three examples have been shot near Thetford this winter ; one of these was a male in full plumage.

Goosander. Four specimens have come to my knowledge as having been taken in Norfolk. Of these, two males in fine plumage were shot at Sennowe, a female was shot at New Buckenham, and an immature male was also taken in the county.

Through the kindness of Mr. C. Lloyd, of Reading, I am also able to inform you that several examples of the arctic tern were shot on the banks of the Thames, at Reading, during the month of November, 1846 ; and also, that a stormy petrel was found dead on that river at Blake's-bridge, November 23rd, 1846.

I believe, also, that a specimen of the eared grebe, and one of the red-breasted merganser, were taken at, or near Wisbeach, in January.

In conclusion, I may observe, that all the winter migrants abounded this season ; there were larger flocks of wild geese than had been known for some years ; sea-gulls were often seen inland ; and we were visited by a great number of magpies and jays, which birds, in the game-preserving districts, are almost rare. — *Alfred Newton ; Everton, Biggleswade, March 30th, 1847.*

Occurrence of Rare Birds near Tadcaster.—The first is the white-winged crossbill (*Loxia leucoptera*), of which a flock was seen in Lord Downes's park, Cowick, near Snaith ; and four of them, two males and two females, were killed on the 27th of December, 1845, by Mr. C. Sumner, of Snaith, and are in the possession of Mr. Reid, bird-preserver, Doncaster. In the March following, five of the same species were seen at Edwinstow, near Ollerton, in some high fir-trees in Budby Forest, and two females and a male were killed : these are in my own collection. It appears to Mr. Reid, through whose hands the whole have been, as well as to myself, that the birds in question are decidedly different from the American white-winged crossbill, of which I have seen several specimens. Our birds are nearly as large as the common crossbill (*Loxia curvirostra*) ; the bill nearly as thick again as in the American species, and the legs lighter in colour and much thicker ; the white bars on the wings very distinctly marked both in the male and female, and the colour of both sexes very like that of the common crossbill. I believe this is the first time of their having been noticed in Yorkshire. The next bird I have to mention is, I believe, new to the British Fauna ;—the roseate gull (*Larus Rossii*), killed on the 22nd of December, 1846, by Mr. Thomas Robinson, of Saxton, near Aberford, in this county ; and discovered by Mr. Graham, bird-preserver, York, who brought it to me. The bird has been sent to Mr. Yarrell, who decides that it is *Larus Rossii*, indigenous to America, but so rare there, that Mr. Audubon has never seen a specimen, alive or dead. I have not made an exact measurement, but it appears about the size of the little gull, the upper parts of its plumage grayish-white, the breast and belly of a light buffish, or perhaps, more properly, salmon-coloured tint ; the bill rather slender, and in the inside vermilion-red ; the legs red and the tail forked. This is a very vague description of this extremely rare bird, but should you wish it, I will send you an exact description. I am going to have a drawing of the bird, and lithographs taken from it, one of which I shall be happy to send you, but the description I can send in a few days. Should you wish to mention in the 'Zoologist' any facts relative to woodcocks carrying their young when disturbed, I can give you some information, having heard from the most authentic sources many instances.—*W. M. E. Milner ; Nunappleton, Tadcaster, March 30th, 1847.*

[Any particulars concerning this habit of the woodcock, and also a full description of *Larus Rossii*, will be most acceptable.—*Edward Newman*].

Rare Birds occurring at Kingsbridge, South Devon.—From seeing your circular, inviting persons to transmit you any rare occurrences relative to Natural History, suited for the pages of the 'Zoologist,' I beg to inform you of the occurrence of the glaucous gull, which was shot in the Kingsbridge estuary last week. I also beg to hand you a list of rare birds which have come into my possession, and have been shot in this neighbourhood within the last seven years :—

Two little bitterns, male and female

Two spoonbills

Two little bustards, females
 Two ospreys, females
 Red-footed falcon, female
 Rose-colored pastor, male
 Night heron, male.

Avocet
 Black tern
 Six hoopoes
 Arctic gull skua

These are a few which I can remember ; should you think it worth your notice, I will in future transmit you any rare occurrences immediately. — *Henry Nichols, Jun. ; Kingsbridge, South Devon, Feb. 19th, 1847.* [Please to do so.—*E. Newman*].

Occurrence of the Golden Eagle near Hungerford.—A few days since a gamekeeper, at Littlecott, near Hungerford, Wiltshire, shot a large golden eagle, a bird almost unknown in the southern counties. The eagle had glutted itself on a dead deer, and was unable to fly away on the approach of the keeper, who fired six times before he killed it.—*Berkshire Chronicle*.

Habits of the Honey Buzzard in Confinement.—The honey buzzard now in my possession was wounded in the wing, and taken about three months ago. It was at first confined in a small garden house, and for a day or two refused to eat anything, but at last began to feed upon small birds, but would not touch raw flesh or any kind of offal, nor has it yet done so, although it has not the smallest objection to a rat or a frog. Many birds of prey, after eating the muscular parts of any animal or bird, leave the entrails untouched ; the honey buzzard, on the contrary, generally begins by opening the carcass, and then devouring everything it finds within it. It is very fond of the honeycomb of the wild bee, and when hungry will swallow large pieces of the comb containing the grub or larva, but when its appetite is not very keen it usually separates the cells, extracts the grub, and throws the wax away. There has been little honey in the combs this year, but when perchance any has dropt from the cells upon the ground, I have seen the bird repeatedly thrust its bill into the earth where it appeared to be moistened by the honey. Unless very hungry it will not attempt to tear open a large bird, but is exceedingly fond of a fresh herring. There is something capricious in the appetite of birds, as well as in that of the human race. I had an eider duck for three years, and during that time, it never could be prevailed upon to taste shell-fish ; its favourite food was barley bread, though if grain of any kind was thrown down to it, it would devour it in the same manner and with the same rapidity as the common duck. Of all the birds of prey with which I am acquainted the honey buzzard is apparently the gentlest, the kindest, and the most capable of attachment ; it seems to possess little of the fierceness of that warlike tribe. It will follow me round the garden, cowering and shaking its wings, though not soliciting food, uttering at the same time a plaintive sound, something like the whistle of the golden plover, but softer and much more prolonged. Though shy with strangers, it is very fond of being noticed and caressed by those to whose presence it has been accustomed. In the same garden there are three lapwings, a blue-backed gull, and a curlew. The plovers are often seen with the buzzard sitting in the midst of them, showing no signs of caution or apprehension, but seem as if they were listening to a lecture delivered by him. The gull frequently retires into the garden house, probably to enjoy the society of the buzzard. The garden is not the garden of Eden, and yet these birds, of different natures, habits, and dispositions, appear to live in perfect harmony, peace, and good fellowship with each other. I have had three living specimens of the honey buzzard in my possession, not one of them in plumage at all resembling the other. One of the three never could be induced to take any food, and after living

about a fortnight, died, I believe, from pure inanition. Besides the plaintive cry above mentioned, the honey buzzard has another and more varied note, apparently of alarm.—*Gordon Joseph Forster ; Newton-by-the-Sea, August 29th, 1845. (Extracted from the Proceedings of the Berwickshire Naturalists' Club).*

Night Conversation of Owls.—Left, whilst standing by my fire, to the uninterrupted action of a busy imagination, I was struck by the apparently intelligent manner in which the owls and other night birds answered each other. Every now and then an owl to the north, not more perhaps than two hundred yards from the camp, would put his questions in a rather startling and distinct manner, and after a measured interval of time, the response, equally distinct, would be heard from the south, very near to me; there being to me, who have a very nice musical ear, a sensible difference in the intonation and modulation of the two voices. I was very much interested in this; everything connected with Natural History is pleasing to me; and the effect was exceedingly increased by the locality, the adventurous life I was leading, and the hour of the night. But what, more than anything else, excited my imagination, was the knowledge I possessed that the Indians are such exquisite mimics of natural sounds; and that one of their tricks, when hovering about a camp, is to imitate the cries of night birds, to lull their intended victims into confidence, and to communicate to each other their observations and intentions. The owl of this part of America is a very gossiping bird: every night numbers of them commence a general hooting, which they continue to a late hour. Milor had told me the first evening, that this was a sign of rainy weather; but I imagine it is merely a social noise they make, for I have often observed, that when a single owl hoots in the night, if you mock him tolerably well, he is sure to enter into conversation with you. I have also heard them hoot by day when the sky is much overclouded, the light being then much more agreeable to them than that of a bright sun.—*Featherstonhaugh's Canoe Voyage.*

Early appearance of the Sand Martin near Penzance.—I observed this afternoon more than a dozen of this species, sporting over some water and meadow-land, near Trevethorn House, which lies in the immediate neighbourhood of Sand Hills.—*Edward Hearle Rodd ; Penzance, March 29th, 1847.*

Nudity of the Base of the Rook's Beak.—This subject having again been noticed in the 'Zoologist,' (Zool. 1638), I beg to add a fact which came under my own observation. It is well-known to many a traveller, that until within these few years a large elm tree stood in the middle of this town, where

“ High on its top, a congregated throng

Of rooks assembling, yearly rear'd their young.”

Early in the year 1842, this tree was cut down, to make room for a new Town Hall, now standing by the spot. The rooks had already assembled to prepare for nesting, and I, being anxious to obtain a specimen or two of the inhabitants of this ill-fated tree, shot two early in the morning of its destruction, as the birds were flying to and fro; one of these was evidently an old bird; the other, I guess to be a bird of the previous season. In the latter specimen, although the throat is nearly bare, the feathers above are full, and cover the nostrils. The two specimens are still in a glass-case, with two starlings, occupants of holes in the larger limbs, perched on branches of their favorite tree. It was to many a subject of regret that this fine old ornament should be levelled to the ground; but such was its fate. On Valentine's Day the tree was sold, as it stood, by public auction; on the 17th of February the hewing was commenced, and on the 18th, about four o'clock in the afternoon, it fell with a heavy

crash, splitting off one of its largest limbs, and smashing into innumerable pieces its smaller branches, mingled with the scattered remains of a number of nests — the work of the poor unfortunate rooks, now left to seek another abode.—*T. Goatley ; Chipping Norton, March 18th, 1847.*

Occurrence of the Hoopoe near Ipswich.—A fine specimen was brought to the Ipswich Museum, this morning, of the female hoopoe, shot at Hollesley last week : its stomach contained portions of earwigs and larvæ. On dissection, we found a number of eggs, which, had the bird lived, we think would probably have been hatched in this country. Is it not of unusual occurrence so early in the year? — *George Ransome ; Ipswich, March 22nd, 1847.*

Occurrence of the Hoopoe in Ireland.—Four specimens of the hoopoe have lately been sent me for preservation ; two of them killed by Thomas Bate, Esq., on the 17th and 24th of March, at Ballyhin, twelve miles south of Wexford : a third was caught at Ballykillaboy, about four miles from Waterford, by a boy who chased it for a mile and back again ; the boy says, it never rose more than two feet from the ground : the fourth was sent me by Mrs. J. Power, of Old Court, in the county of Waterford.—*Richard Glennon ; Dublin, April 3rd, 1847.*

Supposed New British Lark.—It seems worth while to send you the following letter, in case it has not yet met your eye ; I copied it from the ‘*Kentish Gazette*,’ of February 2nd, 1847, to the Editor of which it is addressed.

“NEW SPECIES OF THE LARK.—About a month since was brought me a lark of a most singular colour, which I believed to be a variety of the common lark (*Alauda arvensis*). On dissection, it proved to be a male adult bird. A few days after, Dr. Case, of this town, procured another, corresponding in every respect as to colour and form with the first. I then made an anatomical observation, and compared the anatomy of the common skylark, and found a vast distinction : the second was a female. About ten days since I found another, which is also a female, and of precisely the same structure and colour. All three of the above birds have been examined by the Committee of the Margate Literary and Scientific Institution, to which I am Naturalist, and they agree at once that they are a new species of British bird : this *I am able to prove*. They are all of them of an uniform cream-brown. The name I have given them is *Alauda Isabellina*. Any person wishing to see them may do so by calling at my residence. Hoping you will give this publication,

“I am, Sir, Yours, &c.,

“Margate, Jan. 24th, 1847.”

“S. MUMMERY.”

Should the species prove a new one, it is to be hoped you will give your subscribers the advantage of a figure and descriptive measurements, &c.—*Edward H. M. Sladen ; Warnford, Feb. 12th, 1847.*

Occurrence of the Black Redstart and Harlequin Duck near Torquay.—Among the rarer British birds which have visited us this winter, I have noticed three pair of black redstarts ; and during the same period a small flock of harlequin ducks have frequented our bay, of which, I have been fortunate enough to procure two specimens, a male and female.—*Robert Battersby, M.D. ; Torquay, Feb. 20th, 1847.*

Occurrence of the Gray Phalarope at Mitcheldean.—Last January a specimen of this bird was killed at Mitcheldean on a small duck-pond, close to a farm-house. It was very tame, and had been associating with the ducks some days before it was shot : this bird was sent to me, and is now in my possession.—*J. N. Beadles ; Broadway, Worcestershire, March 3rd, 1847.*

Swans on Lake Pepin.—About a quarter past twelve we suddenly came upon Lake Pepin, and the weather having improved into a fine sunny morning, the spectacle which presented itself was as rare and beautiful as any I had seen the whole summer. Upon the smooth and glassy surface of the lake hundreds upon hundreds of noble swans were floating with their cygnets, looking at a distance like boats under sail. The cygnets were still of a dull yellow colour, and all the birds were very shy. It made a beautiful picture, and after contemplating it awhile, we again plied our paddles, and half an hour before sunset stopped on the left bank of the lake, about eight miles from its mouth, and encamped for the night on the beach.—*Featherstonhaugh's Canoe Voyage.*

Occurrence of the Bimaculated Duck.—On the 9th of last December I obtained a female of the bimaculated duck from Leadenhall Market, where it had been sent from Yarmouth. Mr. Yarrell, to whom I showed it when freshly skinned, expressed an opinion that it was a hybrid, but very kindly gave me access to the specimens in the Zoological Society's Museum, and on a comparison with the female specimen of the bimaculated duck which formed a part of Mr. Vigors' collection, it proved to be identical with that species, differing only in having a somewhat darker mark through the eye, the top of the head having the markings darker, and the plumage generally not quite so much tinged with rufous. The buff of the chin and throat is also purer and rather more extensive, as well as being better defined. The speculum, too, does not reflect quite so purple a tint, being a very bright green. However, these are very slight differences, and such as I find, by examination, to exist between female individuals of the common wild duck, which very nearly resembles the female of the bimaculated duck, except in size. This specimen measured, when fresh, $17\frac{1}{4}$ inches from the point of the bill to the end of the tail, and in stretch of wings 27 inches. The irides reddish-brown. The stomach was half-filled with fine sand. It had evidently been decoyed, as the neck was dislocated. This specimen makes the fifth recorded to have been taken in England. The first is the one mentioned by Pennant; the second and third, the specimens in the Zoological Society's Museum; and a fourth, obtained by Mr. Bartlett in 1843. All, except Pennant's, have been obtained from Leadenhall Market. Several continental naturalists have mentioned the bimaculated duck, but I cannot learn where they have obtained their specimens. Pallas, I believe, figured it, so has Meyer, and Temminck speaks of its being subject to variety, yet no foreign specimens have ever found their way to our museums or private collections; at least not any that I can gain any intelligence of. Perhaps some of your numerous correspondents can give some information on this subject. An opinion has lately been expressed, that this species is nothing more than a cross between the pintail and widgeon, but to me there appears very slight evidence of this; the buff colour of the bar across the secondaries, in the male bimaculated duck, immediately above the speculum, being the only respect in which it in any degree resembles the male pintail. To the male widgeon there are no points of resemblance. Mr. Bartlett, has, however, suggested to me a far more probable cross, which is, between the wild duck and teal, and on subsequent examination, I have found considerable evidence in favour of this, but at the same time several peculiarities which remain unexplained. I will endeavour briefly to state the result of these investigations. The back of the male bimaculated duck very greatly resembles that of the mallard, but has the long yellow mark on the elongated scapulars, which is so conspicuous in the male teal. The tertials, immediately above, and as it were, parallel with the speculum, exactly resemble those of the mal-

lard. The speculum itself resembles most nearly the mallard's, being of a brilliant green; in the teal it is half green and half black. The lesser wing-coverts resemble the mallard's, as do the primaries and tail. The two middle feathers of the upper tail-coverts are the same colour as in the mallard, and very slightly curled upwards. The breast is an exact mixture of the two species, having the purplish-chestnut of the mallard mixed with the spots of the teal. Having now stated some of the principal points of resemblance to such a cross, I will state in what respects it differs. First, then, the supposition of its being a hybrid between the teal and wild duck does not in any degree explain the two peculiar spots on the cheeks indeed it so nearly resembles the Japan teal (*Anas formosa*), in the form and position of these spots or marks, (an undoubted species and true duck), that one might be almost led to think it as constituting a generic character. It is true, that the head is a mixture of green and chestnut, and so far is a mixture of the teal and mallard. The next dissenting point is the buff bar across, above the speculum, which in the teal is white, slightly tinged with buff, and in the mallard white, which is again tipped with black, making a double bar. Much more might be said on this subject but I hope enough has been said to draw the attention of those to the subject who may be fortunate enough to procure a fresh male specimen of this rare bird: in which case, I most sincerely hope that accurate measurements may be taken, and the trachea preserved, which in the males of the duck tribe forms a very distinctive character: the sternum too would be valuable. Unfortunately, I was not aware of the rarity of my specimen until the body had been thrown away. Until a fresh male specimen can be obtained and examined, I fear the uncertainty which at present exists respecting this species will scarcely be cleared away. Mr. George Gray, to whom I have shown the specimen, thinks the supposition of its being a hybrid a very probable one. Since writing the above, I have received a note from Mr. Bartlett, in which he speaks of two hybrid ducks, an account of which has been transmitted to him by a friend at Shrewsbury; which, if I understand him correctly, are a cross between the pintail and widgeon. He says, "They are 24 inches long, and want the markings on the breast to make them like the bimaculated duck; the middle tail-feathers are more than an inch longer than the rest." The fresh specimen of the female bimaculated duck, it will be remembered, measured but $17\frac{1}{4}$ inches. I sincerely apologize for writing so lengthily a paper to occupy the space of your most valuable journal.—*R. F. Tones; Weston, Feb. 18th, 1847.*

Occurrence of the Ivory Gull at Penzance.—A bird of this species was shot from our Pier Head, on Monday the 15th instant, after having been observed, for a day or two previously, in company with common sea-mews and herring gulls. It alighted several times on the New Pier, Battery Rocks, &c., adjacent to the town, without betraying any apparent shyness. The note of the bird was described to me as being the reverse of harsh and grating, as referred to by authors. It more resembled the warbling, chirping whistle of oyster-catchers, but was deeper and louder; this peculiarity of tone attracted the notice of men and boys at the quay, who are accustomed to the screaming and clamorous cries of the common gulls. This specimen measured $17\frac{1}{2}$ inches in length; the plumage on the back, scapulars, and wing-coverts, is studded with well-defined dusky-brown spots; the tips of the quill-feathers for half an inch are of the same colour; the tail-feathers are similarly marked, and being of equal length, present an uniform dark line across the end of the tail. This example has passed into my possession, and I am not aware of any record of its having been before obtained in this county.—*Edward Hearle Rodd; Penzance, February 27th, 1847.*

Occurrence of the Ivory Gull in Aberdeenshire.—The continued prevalence of snowy and tempestuous weather for some time past has compelled the arctic birds to leave their customary retreats; and, in consequence, some of those species which are rarely to be seen in this country have lately made their appearance on the shore along the Moray Firth. Of these, one of the most unusual and interesting is the ivory gull, the *Larus eburneus* of authors. An individual of this species was observed, for several weeks, in company with two Iceland gulls, and another gull with a brownish plumage. Its mode of flight was regular, very lofty, and well sustained. Its particular cry was not heard. It was at length shot on the 29th of January last, while seated on a rock, about four miles to the eastward of Banff. On dissection, it proved to be a female. In length it measured 1 foot 6 inches, and in extent of wing 3 feet. Its weight was twelve ounces. It has been stuffed, and is now before me. It is a very beautiful bird, although it would seem not to have reached the complete state of maturity. This is indicated by a grayish-black bar, which extends from the base of the bill to the eye; by some faint streaks of the same colour on the head, the nape, and the throat; and by a few inconspicuous specks close beside the spurious wing. A brownish-black colour appears in a very slight margin along the end of the tail, and on the very tips of some of the quill-feathers. In every other part of its plumage the bird is of the purest white, and has none of that yellow tinge which is more or less discernible in *ivory*. On this account its specific name of *eburneus*, or *ivory*, is not, strictly speaking, accurate, and *niveus*, or *snow white*, would be undoubtedly a more correct designation. There is no appearance of red in the orbits of the eyes, and its bill has no yellow upon it; the presence of both which characters is given by Dr. Richardson, who is usually very accurate, as marks of the bird having attained to full maturity. It agrees, indeed, in every particular with the description given by that distinguished traveller and naturalist, of an immature bird of this species, which was killed at Hudson's Bay. (*Fauna Boreali-Americana*, vol. ii. p. 419). A specimen of the ivory gull, having, also, a few marks of immaturity, was obtained in Shetland in 1822; and, it is believed, is now in the Edinburgh Museum. It was from this specimen that Bewick made the woodcut for his 'British Birds,' which agrees exactly with the present specimen, except in the circumstance of the upper mandible in the cut being more strongly hooked than in the bird before me. The bill, judging from the present specimen, is rather lengthened, and not remarkably strong; and the angular knob on the outer edge of the under mandible is not very decidedly marked. The legs and toes are black. The under surface of the webs and toes is unusually rough and warty. Mr. Selby says, that a specimen, also immature, was obtained since 1822 in the Firth of Clyde, and it is stated by Sir John Ross, in the Appendix to his Voyage of Arctic Discovery, (published in 1835), that the ivory gull had recently made its appearance on the western shores of Ireland. The present specimen was shot and mounted by Mr. Thomas Edward, a journeyman shoemaker in Banff. This individual, although moving in a humble walk of life, and without the benefit of an extended education, has been long actuated by an enthusiastic admiration of the works of nature, and has persevered in their pursuit and study, amid difficulties and discouragements, which few would have continued to encounter. He has directed his attention to all the departments of Nature within his reach; and, by his own unaided exertions, has become an excellent stuffer and preserver of the various objects in Natural History. His collection, formed entirely by his own industry, and in moments when not at his regular and daily employment, and greatly admired by those who were the most competent to

form an opinion of its merits, amounted lately to several thousand objects. These he has been compelled, from circumstances, to part with, at a price very far below their real value; but, undismayed by this, he is still as anxious as ever in his researches, and as devoted as before in his love of Nature. Such an example is well worthy of imitation, and deserves to be known; and I trust that, on this account, your own excellent publication may be the means of recommending this meritorious and modest individual to a more extended notice than he has yet enjoyed. I may mention, while on the subject of birds deemed rare, at least in your part of the island, that, while in pursuit of the present specimen of the ivory gull, the individual now mentioned, met, in one day, and in a walk along the coast of scarcely five miles, with no fewer than fifty-seven specimens of the little auk, (*Mergulus alle*), which had been washed ashore dead. It may easily be conceived how furious and continued the storm must have been which deprived so many of these intrepid little navigators of life, on that very ocean, where, in ordinary weather, they disport themselves in safety, and find ample means of subsistence. Specimens of razor-bills, guillemots, and puffins were seen, at the same time, strewn about in corresponding numbers.—*James Smith; Manse of Monquhitter by Turriff, Aberdeenshire, Feb. 15th, 1847.*

Occurrence of the Gannet near Dartford, Kent.—A few days since, a gannet (*Sula alba*) was brought to me, which had been captured by a shepherd in a turnip-field, about three miles from this place. The man had much difficulty in securing it, and his hands were torn in many places by its beak. The facts of its not flying when he approached it, and of there being no food in its stomach, induce me to suppose it was weakened by hunger. I hardly know whether the circumstance is worth writing about, but I have neither seen or heard of its occurring so far up the Thames; and the field in which it was caught was fully five miles from the river.—*R. O. White; Swanscombe Cross, near Dartford, March 5th, 1847.*

Occurrence of the Little Auk near Chipping Norton.—In December last, a specimen of this aquatic bird was caught thus far inland, on a farm at the village of Salford, about two miles from this place; it was brought alive to the town, and has since been preserved. Some years since, another individual, killed by one of the hawk tribe, was picked up in an adjoining parish by a young farmer, who tried to shoot the aggressor, but in vain. The prize was stuffed, and is still in the same person's possession.—*T. Goatley; Chipping Norton, March 18th, 1847.*

Birds taken up in a Balloon.—At the altitude of 11,000 feet, they liberated a greenfinch, which flew away directly; but soon feeling itself abandoned in the midst of an unknown ocean of clouds, it returned, and settled on the stays of the balloon: then mustering fresh courage, it took a second flight, and dashed downwards to the earth, describing a tortuous, yet almost perpendicular, track. A pigeon, which they let off under similar circumstances, afforded a more curious spectacle: placed on the edge of the car, it rested awhile, measuring, as it were, the breadth of that unexplored sea which it designed to traverse; now launching into the abyss, it fluttered irregularly, and seemed at first to try its wings in the thin element; till after a few strokes, it gained more confidence, and whirling in large circles, or spirals, like a bird of prey, it precipitated itself towards the mass of extended clouds, where it was lost from sight.—*Scientific Gazette, August 6th, 1825.*

Notice of Ornithological and other Occurrences in Norfolk for the Month of March, 1847.—The early part of this month was marked by the disappearance of the unusual numbers of the marsh-tit, referred to in our last communication (Zool. 1691).

A few remaining stragglers of the common winter wild-fowl, and with them a few immature specimens of the red-breasted merganser, occurred about the same time. It has been observed by Mr. Palgrave, at Yarmouth, that the hooded crows appeared to congregate at that place, previous to their northward migration, about the 18th of this month, and that many of them appeared to depart with a south wind, which sprang up on the 20th: the same wind was observed to bring with it a considerable number of pied wagtails, several of which were seen to alight in a field near Caistor. The migration of this bird in Norfolk was not before known to us. The Slavonian grebe, which (still retaining its winter dress) generally passes through Norfolk during this month, on its northward migration, in tolerable abundance, has this year been decidedly less numerous than usual. A male lesser spotted woodpecker was killed, about the third week of the month, at Blickling, (a parish which has been previously observed to be a locality for this species), and about the same time a male gadwall was killed at Surlingham. At the end of the month several specimens of the pintail and garganey ducks occurred on different parts of the coast. A very beautiful specimen of the little crane, in adult plumage, was also taken near Yarmouth at the end of the month. On the 31st, a pair of woodlarks were observed on some hollies, at Easton; and we are inclined to suspect that the few birds of this species which are found in Norfolk arrive about this time, and that the opinion which we have expressed as to their remaining in Norfolk through the winter (Zool. 1310) is incorrect. A butterfly, the description of which leaves no doubt that it was the Camberwell Beauty, was observed at Easton on the 22nd of this month, about $\frac{1}{2}$ past 4, p.m. The afternoon was very fine, and the insect was observed fluttering over some heath for a short time, when it rose and disappeared among the tops of some neighbouring birch trees.—*J. H. Gurney, William R. Fisher; March, 1847.*

Errata in the Notes for January and February.

At page 1691, the second line from the bottom, for *seeking*, read *netting*.

„ 1692, the fifth line from the top, for *martin*, read *merlin*.

„ „ the twelfth line from the top, for *shrew*, read *smew*.

A Tortoise Bank.—The river now expanded to about eight hundred yards wide, and paddling pleasantly along we came to a high sloping bank of loose sand, which I landed to examine. It had an angle of more than 50°, had a south-west aspect, and was composed of loose, sharp sand, derived from disintegrated rock. This was one of those tortoise-banks occasionally found on the margin of the rivers where that amphibious animal abounds. In the upper parts of the Tennessee and its tributaries they attain a large size, as I had occasion to remark when examining, upon a previous occasion, the country watered by the Holston. The contrivance of this species (*Trionyx ferox*) for providing for the hatching of its eggs forcibly shows the power of animal instinct; and the details respecting it which I am about to give may be considered as illustrating some of the phenomena connected with the fossil footmarks found at Corn Cockle Muir, and at Craigs, near Dumfries, where the inclination of the strata is also about 45° S.W. Where a slope like the one I was now examining exists near waters

inhabited by this species, the animal, at the proper season, crawls up it, and when arrived at the top begins to make its nest. This is done by screwing its body repeatedly round in the sand, until it has scooped a pit sufficiently large; here it lays from twenty to forty round eggs, generally without a shelly calcareous covering, but covered with a tenacious membrane. Sand is then scratched over the eggs to the depth of six or eight inches, which the tortoise pats down firmly by rising on its hind-feet, and flattening the nest with its anterior extremities. When the sun has hatched the eggs, the young animals force their way out of the sand, and following their own instinct, and the inclination of the slope, roll down into the river.—*Featherstonhaugh's Canoe Voyage.*

Sagacity in Frogs.—I have read with much interest the curious anecdote of the frogs (Zool. 1643), but finding that I cannot acquiesce in the suggestions of the narrator, as to the motives for their conduct, I am now about to examine why, and also to see whether I can suggest anything that appears to myself more probable. In the first place, I am strongly predisposed to consider the frog incapable of the implied degree of sagacity; both because I cannot recollect to have seen, heard, or read in books of authority, proofs or indications of anything at all equal to it in the frog, nor yet in any of his relations,—toads, newts, lizards, snakes, fish; and also because even in the hot-blooded animals, whose intellects for the most part seem to be of a higher order, similar instances of sagacity are very rare. Where can we find them at all? Perhaps here and there in some pre-eminently gifted individual of one of those superior races of animals who are constantly in the company of man, who every day experience his benefits and his power, and who have learned to look up to him and to trust in him for everything. But the frog is none of these: if we allow him to have sufficient sagacity, he has nevertheless none of the opportunities necessary for acquiring that knowledge of man and of his nature, which the subjects of our present consideration are supposed to have possessed. Even were the knowledge of man instinctive, these frogs showed further very great ingenuity in the plans of action they founded upon this knowledge of theirs: and of their being master of such ingenuity and sagacity, we are, I think, entirely without sufficient evidence. And not only do I think him incapable of assisting a friend in misfortune in the manner supposed, if he wished to help him, but I even doubt whether he ever would wish it. Do we know any instances of frogs or toads caring for their wounded or imprisoned fellow-creatures? In other classes of animals, no doubt, it is common for certain species to assemble round an injured companion; but often in anger rather than in love; and in putting him out of his misery, they show the kindness of their Creator rather than their own. What other explanation then do we give for the facts recorded by Mr. Davis? In the first place, we declare that because we question the correctness of his views, we are not therefore compelled to give satisfactory ones of our own; because, upon the general principles of reasoning, this is not required; and because, in this particular instance of the frog, an animal with whose habits, feelings, and senses, we have so little in common, it is very difficult to explain any part of its conduct.

But let us consider the circumstances before us. Two frogs are observed acting in an extraordinary manner, close to a spot where some hours afterwards a frog is found imprisoned, in such a way that he was most likely in the same state when the other frogs were seen at liberty. Now, at first, it seems highly probable that he was the cause of the assembling, and of the excited movements of the other frogs. But we must argue from what we already know of the habits of the frog in general, and if we

find we do not know enough, we must wait for further facts to be ascertained, either by accidental or experimental observation.

First, then, we know that frogs make at least two or three different kinds of noise, which, reasoning from universal analogy, we suppose other frogs to be able to distinguish and understand. They have their breeding croak; their cries of despair, when pursued by a bird of prey; and, I think, other sounds expressive of bodily pain. Secondly, we know that some of their notes have the effect of collecting other frogs. Thus, in the spring, the croak proclaims the rendezvous for spawning, and in the autumn something of the kind may be used to assemble those clusters of frogs which are found hybernating together; as we are told that rattlesnakes, on a similar occasion, collect themselves together by means of hissing. We only want then to know *for certain*, whether a frog, trapped by the leg, would sooner or later cry out; and then whether this would have the effect of collecting others? We have seen, from what we know of the frog, that both these are likely, and it is a likelihood much strengthened by what we know of the habits of various other animals, a consideration indeed to which we are apt to give too much weight. But still there is the climbing and jumping down to be accounted for. We reject, for the reasons given before, Mr. Davis's explanation of these actions. We find a difficulty in connecting them with the prisoner at all, unless we may consider them the result of infatuated excitement about him in the other frogs. This leads us to conjecture whether, after all, he may not himself have been playing the same tricks when he was trapped in the blind. But, whether it was so, or whether his noise, being merely an ordinary croak, deluded the other eager frogs into false hopes of there being something worth going for, we may in either case venture the following suggestions.

It is a rainy evening in October, the time of day and the sort of weather when frogs are sure to be on the move, and the time of year when we may suppose them to be looking out for lodgings for the winter. The rain comes streaming from the roof, or is heard running down spouts: the frogs suppose, instinctively, that where water runs down there must be more above, and they try to climb up, hoping to find a pond where they may lie in the mud till spring. By instinct, fishes in a pump-trough, try to swim up any little jet by which fresh water is supplied to them. Perhaps our frogs, having got some little height, mistake the glass for water, and try to jump down into it; or the glass looking so like water, may have been what originally attracted them, especially if there is any rising ground before the window. The probability of these suggestions will of course much depend upon local circumstances, as whether they could have had access to a pond without any trouble.

Another explanation that might perhaps suggest itself, is, that if they were in a walled garden they were trying to climb out, as every one has seen frogs sticking their toes into the sides of wells in the most uncomfortable efforts to escape, and as we know snakes and lizards will make great exertions for the same purpose; I have even seen vipers in the ivy, nearly at the top of a ten-foot wall. But we must not forget Mr. Davis's first idea, that the light may have attracted them, for it is curious how many animals are attracted by light; some insects, perhaps more than we are apt to suppose, mistaking it for the signal of their mates; some birds perhaps guiding their nocturnal flight by it, instead of by a star; other birds, thinking themselves in a confined space, flying to the light as to a hole for escape; some fishes, possibly seeking phosphorescent food, come to the light by mistake; other animals being excited by curiosity; whilst in many cases, we cannot even venture a guess as to the reason of a light

being such a great attraction ; but has any one observed frogs undoubtedly so influenced ?

I have, perhaps, after all, made but little advance towards the truth ; but I have, I hope, explained why I cannot consider the extraordinary sagacity of the frog at all established by the anecdote before us. But that we may come to some satisfactory determination, we must make observations and experiments, and communicate to the 'Zoologist' any important results of them. I shall be really glad if these tend to elevate my present views of the moral and intellectual attributes of the frog ; for I well remember the time when I fondly looked upon him as the most pious of animals. Besides, his attitude of prayer, and his resignation in the extremity of danger ; when I saw the fair and plump young frogs carrying their helpless relatives, I used to think it a case equalled only by the Dutch story of the stork, and by that of Æneas after the siege of Troy.—*I. Wolley.*

Notes on the Fishes of the District of the Land's End.

By R. Q. COUCH, Esq., M.R.C.S.L., &c.

(Continued from page 1648).

The "schull" to which I have been referring is the one commonly called the "summer schull ;" there is another which the fishermen call the "winter fish." This last, from the spot in which it first appears, from its course, and from the appearance of the fish, is perfectly distinct from the former. The winter shoals always first appear on the north-eastern portions of our shores. They are very rarely seen to the east or north-east of Sunday Island. After having touched the shore, they always pass down close by the coast, and that in such vast swarms as even to obstruct the passage of vessels through the water. That this is no exaggeration may be rendered evident from the statement of one among many ascertained facts. At the usual time, in 1834, this immense shoal passed into St. Ives' Bay ; and a portion remained in the waters on its western side, and occupied the whole of the distance from the mouth of Hayle River to the town of St. Ives, a distance of more than two miles in a direct line, and the transverse diameter was about three-fourths of a mile. To this mass of fish a seine was shot ; or to render it clearer, to persons not accustomed to the fishery, a seine was made to enclose as much as its length would allow, and my friend, Joseph Carne, Esq., has furnished me with the result. He says in a letter, "The largest shoal of pilchards ever enclosed, was taken in a seine of Mr. Roger Bearne at St. Ives, on the

25th of November, 1834. The fishermen were engaged *in tucking*, or taking the fish out of the seine, from the 26th of November (Sundays excepted) to the 5th of December. In that period one hundred and twenty boat-loads were landed, one boat-load was sunk, and several loads were lost in *tucking*. The whole quantity taken up and carried to the cellars was 3600 hogsheads, which with the lost fish would have been at least 4000 hogsheads, each containing fifty wine gallons, or about 3000 pilchards, (as the fish were not large), making altogether the enormous quantity of 12,000,000 fish." To render the density of the fish still more intelligible, I should observe that a seine is about 160 fathoms in length, and from eight to twelve fathoms in depth, so that the 12,000,000 pilchards were enclosed in a circle not fifty-four fathoms in diameter; and in this case but seven fathoms deep. On the same occasion other seines were "shot," but in consequence of a legal dispute, some of the fish were not taken off the nets for some days, and for security the seines were drawn a few fathoms towards the shore and anchored. It was subsequently thought best, however, to land the fish first, and decide the dispute after. But on *tucking*, all the fish were discovered to be dead; the slight alteration in the depth of the water on such a dense mass had suffocated the whole. These are striking, but not singular instances of the density of the masses into which the pilchards frequently congregate. As they pass in such immense shoals parallel to the shores, discolouring the waters and filling our bays, large quantities are frequently pushed on shore by the moving hosts behind. Their course can be daily watched from the hills, after they have once approached the land. In October of 1846, the shoal passed into St. Ives, and while on the western shores of the bay, 30,000 hogsheads were enclosed in a few hours: now if we suppose 2500 only to the hogshead, we here have 75,000,000 fish enclosed in a single port in one day, while large quantities remained at liberty beyond. Of this catch about 23,000 hogsheads or about 57,500,000 were landed. The winter shoals are remarkably punctual in their appearance; they generally arrive at St. Ives about the third week in October, varying to the first week in November. In 1844 they passed the whole length of the Cornish shores to St. Ives on the north in about four days, and from this circumstance they were expected round Cape Cornwall and the Land's End daily; but they took three days to make the circuit of St. Ives Bay; still on passing Clodgy Point, its western boundary, they resumed their rapid progress, and in two days made their appearance in Mount's Bay and

passed up the British Channel. In their passage round the Land's End, they passed close to the rocks. The winter fish are larger, but by no means so oily as those of the summer. A hogshhead of summer fish will produce on an average about four gallons of good oil; sometimes, however, so much as nine gallons have been expressed, and at others only two and a half, and three. The average of the winter fish will yield only two, or when very good, three gallons. But it should be observed, that the quantity of oil expressed in winter slightly varies with the character of the weather; if the cellars be well ventilated, it is less than when the windows and doors are closed. So that if the summer fish could be cured in very cold weather, the average might be something less than four gallons; and the winter fish might produce more if the weather was warm. But there is a decided difference in every particular between the two sets of fish. The foregoing observations refer chiefly to the annual migrations of this fish, but there are more minute habits, which disappear in the great annual assemblies, and these exert some influence on the fishery. During the periods when they are not sought after by the fishermen, they wander either singly or in small companies, in deep water, and rarely mount to the surface. As summer advances they congregate into small companies, but they show a greater tendency to do so during the day, especially towards the afternoon, than in the night. As night approaches, they show an inclination to move off the shore, and re-unite, after daylight, in the morning. But when the force of the migrations is fully established these habits become obscured, and finally become obliterated, or rather overwhelmed, in the general tendency of the whole to approach the shore. The seine fishery is carried on from sunrise to sunset, and the drif-tnet from sunset to sunrise.

While the general course or direction of the fish appears to have been always similar to that of the present day, yet the seasons vary very much as to the quantity taken, and taking remote dates as a guide in periods of their appearance on our shores. Lately, however, they have rarely varied more than a few weeks. If we look at the old records we find the fishery entirely different from what at present obtains; thus in 1747, Falmouth exported 14,632, and Penzance about 12,149 hogshheads, and St. Ives only 1282 hogshheads. This, however, may not have arisen from a change of any one of the shoals, but from a change in the preponderance of the summer or winter fish. But there are certainly variations in their points of arrival; spots that in former years were their favourite resorts are now never visited by

them. The fishery on the Devonshire coasts, such as at Dartmouth, Bogburry Bay, &c. are, I believe, all but given up. St. Ives, from having only one seine, and that belonging to Messrs. Boletho's, has now 180, a number greater than all the other stations can produce. The general place of resort for the pilchard is to the west of the Scilly Islands and the circumjacent water, some of the smaller shoals even frequenting the southern shores of Ireland; but Thomas Boletho, Esq., informs me that in 1836 the great mass of the fish appeared on the north-east part of the Bay of Biscay in September. In that season the fishery was very late; so late, indeed, that it was almost given up as an entire failure. A captain of one of his vessels from the Mediterranean arrived, and told him of an immense shoal he had passed two days before, and which he left forty miles to the south-west of the Lizard, in the Bay of Biscay, the course of which was in a north-easterly direction. His tale was, that from the time he fell in with them he had a light breeze and was going before it about five miles an hour, and that the time occupied in going through the mass was more than twenty hours, making at least a shoal of a hundred miles in length, the breadth he could not ascertain. He discovered what they were by taking some up in the ship's bucket. Two days after, his account was confirmed, by the shoal approaching the shore, and extending from Fowey to the Land's End, a distance fully equal to what he had described, if the windings of the shores enter into the consideration. While, however, they do not extend much beyond the Cornish shores, yet some have been taken in the Downs, and off Dover, and the Isle of Wight, by the herring drift-nets; and a few have been taken on the Coast of Spain. In 1791, the drift-nets took large quantities in February, and in 1834 they were abundant at Mevagissey about the same time. It may, therefore, now be asserted that the pilchard remains off the Cornish shores throughout the year. The largest quantity ever secured in one day occurred at St. Ives in September last, the 30,000 hogsheads referred to before.

It may be interesting, perhaps, to some of your ichthyological readers, to refer, however briefly, to a few of the more casual traits of this small, but important fish. On the southern shores of Cornwall the herring is rarely to be met with, except in a few straggling companies. On the northern shores, however, the herring is more abundantly caught. It is a habit of all the species of the genus *Clupea* to associate in companies and shoals; but the herring and pilchard never intermingle. Small companies of each will pass and repass each other without mixing. Early in the season some boats will capture

herrings, while others, but a short distance from them, will take nothing but pilchards; others again will take both, as might be expected from the nature of the drift-net fishery. The seines also will sometimes enclose one and sometimes the other, but never both, in such quantities as to lead us to suppose an indiscriminate mixture of the two. When they are first preparing for their migrations, fish of the same size and fatness always herd together; so that different seines will take very variable fish; but when the whole are united and the migratory feeling is at its greatest development, then the largest and healthiest fish take the lead, and the weaker and smaller portions take up the rear and form one shoal; hence the fish first taken are generally the best. It is also a remarkable circumstance, that when the pilchard has assembled, it displaces all the other fish having a similar habit. It drives nearly all other kinds away, except those which make the pilchard their prey, such as the hake; but in the largest "schulls" even these disappear. These facts will explain several observations of the fishermen, by which they regulate their hopes and fears. At St. Ives, it is a general remark, that the herrings always are inside the shoal of pilchards, and that when these are taken near the shore, the bulk of the pilchards may be expected, the explanation being that the herrings are driven before the advancing hosts. If mixed fish are taken in the drift-nets, no shoals are expected, in consequence of the assembling not being completed.

My notes for the season just past, after the foregoing lengthy remarks, shall be very short. The fish were seen daily from the time of their first appearance. The fishery began, in this district, in August, and on the 5th, moderate quantities were taken off St. Ives; about five thousand per boat, per night. On the 9th, 10th, and 11th, small catches were taken in the south-west part of Mount's Bay, and one seine shot and enclosed about two boat-loads: at this time, to the east, 1200 hogsheads were taken in Gerran's Bay; and the drift-nets were very successful at Falmouth, Charlestown, Mevagissey, Fowey, Polperro, and Looe. From the 12th to the 19th, the catches in Mount's Bay continued small; about the Lizard, one thousand hogsheads were taken; at this time no pilchards were taken at St. Ives. From this it appears, that the shoals crossed Mount's Bay eastward, to the Lizard and the eastern stations, in deep water. While they were thus abundant in the east, they were all but absent in the west. From the 19th to the 26th, very few pilchards were taken at Mount's Bay; and none at St. Ives. At Falmouth the catches were good; but at

Looe, Polperro, and Cawsand, in Plymouth Sound, the quantities taken were greater than before, showing an eastern movement. From the 1st to the 8th of September, the fish came nearer the shore, and were taken in large numbers at Polperro and Looe, equalling 30,000 per boat, every night. At this time, while the summer fish were on the south-western shores of the county, the winter fish were observed on the north-eastern shores, at New Quay, about three or four miles from land. On the 13th, the northern fish were seen from the hills near St. Agnes; and on the 15th and 16th, off St. Ives, but the shoals were small and distant: large catches were still made on the south-eastern shores. From the 16th to the 19th, south-eastern fishery still successful; the north-eastern shoals off St. Ives in deep water. For a week after this, all the fisheries failed, but the shoals were observed to be congregating on the north-eastern shores; and on the 27th, *heva* was sounded at St. Ives. The Bay was full of fish from one side to the other, and 30,000 hogsheads were quickly enclosed. From this point they go further west, sometimes beyond the Scilly Islands, and at others between the Islands and the Land's-End. In some seasons, after thus passing south, they take an easterly turn along the south coasts to Mevagissey Bay, where they generally arrive about the middle of November. But in every case in which they have gone so far to the east, they have been followed by large Cetacea, generally *Delphinus delphis*, several of which have from time to time been taken. This year the winter fish arrived at St. Ives several weeks earlier than usual. Mr. Boletho made a very interesting observation to me, a short time since, in reference to the movements of the pilchard and the herring, which, if it always proves correct, will be worthy of further investigation: he stated, that the herring fishermen of Yarmouth were always desirous of carefully ascertaining the time when the pilchard arrived at St. Ives, for that the arrival of the pilchard at St. Ives coincided to a day with the arrival of the herrings at Yarmouth; whether the season was early or late, they were early and late together; and if the pilchard at St. Ives arrived without the herring at Yarmouth, the fishery proved a failure for the season.

The pilchard frequently arrives close to the shore before they are discovered; in such a case the drift-nets serve as an index to the seine fishermen. The experienced eye of the *huer*, or watcher for the fish, can, however, frequently detect their presence when all others would fail. On one occasion, a huer at St. Ives raised the cry of 'heva,' when no one else could see the least indication of their presence. The seine, however, was shot according to his direction, in a

muddy part of the bay, but still no fish appeared till many hours after, when they all rose to the surface simultaneously, and 1200 hogsheads were afterwards taken up. The pilchard is very sensitive to atmospheric changes; if there should be cold bleak winds from the east, north, or north-east they rarely rise or approach the shores. If it should be a calm, or a good breeze from the south, south-west, or west, they very rapidly associate; and a day or two previous to a storm they will frequently move with great rapidity. The shoals are supposed by the fishermen to be guided by what may be called a king, or at any rate by the larger and stronger individuals. They always move with great precision, and all their evolutions are simultaneously effected. A shoal, when enclosed, will sometimes remain motionless, in regular order, with their heads all turned in one direction; if the boat be struck loudly, the whole will instantaneously turn to the opposite point without the least confusion, like soldiers at a review.

The number of drift-net boats engaged in the pilchard-fishery in Mount's Bay is 180, each having seven men, and the quantities taken by them are very great. Each hogshead contains from 2000 to 2500 fish. The quantity exported for the last ten years amounts to 176,168 hogsheads; one-third more is used for home consumption, and large quantities, from being suffocated in the seines, are yearly used for manure.

During the last season 33,959 hogsheads have been exported, 3052 of which were sent to Genoa, 8499 to Leghorn, 1368 to Civitta Vecchia, 13,309 to Naples, 7731 to the Adriatic: of these 16,577 were exported from St. Ives, 7983 from Penzance, 3213 from Mevagissey, and the remainder from Falmouth, Looe, and Charlestown. As it is not the object of these notes, already extended beyond their intended limits, to refer to the fisheries any further than to illustrate the habits of the fish, the account of them is designedly omitted.

The Herring, *Clupea harengus*. Though there is no special fishery for the herring on the Cornish shores, yet they rarely appear on our northern coast in sufficient quantities to have a short period of drift-net speculation devoted to them. On the southern parts of Cornwall, they are so scarce and uncertain in their appearance, that they are only taken by accident in small quantities; and even then are not at all desired. They are caught by such drift-nets as are fishing for the early shoals of pilchards in July and August. At this time the pilchard is congregating, and the herrings are frequently mixed with them. They are chiefly to be found in deep water, sometimes going east and at others west, in small shoals. They are more abundant

about Plymouth, and to the east of that port, than off Mount's Bay ; for they decrease in numbers as you go in a westerly direction. About August their course is easterly. The opinion of the fishermen about this direction is, that those fish which visit the southern shores come through the straits of Dover, while those of the northern coast pass through the Irish Sea and St. George's Channel. The fishermen of Mount's Bay, before they go on the Irish herring-fishery, are engaged in taking the mackerel off Mount's Bay and the Land's End, and they found it necessary occasionally to go to the west of the Scilly Islands : at this time they frequently see small flocks of herrings, either sporting about at the surface of the water, or going in a northerly direction. These they have, within the last few years, attempted to take by means of the drift-net, a few pieces of which they take with them for that purpose ; but they have never been successful, and the plan is now given up. I cannot discover that those herrings seen near the Scilly Islands ever pass up the British Channel. They are rarely taken in Mount's Bay ; but in St. Ives, on the north coast, they are frequently caught in large quantities, so late as September, October, and November, when they are in larger bodies than in June and July. Thus in 1845, from the 4th to the 10th of September, 120,000 were taken at St. Ives. They are common also on the north part of the Devonshire coasts, and are there taken by the drift-nets. But they are very uncertain in their movements ; for during some seasons they are abundant, and in others are hardly to be seen. At St. Ives, they are in some measure governed by the presence of the pilchard, for they are always taken in the greatest quantities when there are no pilchards, or immediately before the large "schulls" appear ; the reason for which is given in the account of the migrations of that fish. The largest quantities, however, pass up the St. George's Channel and Irish Sea about the end of May or early in June. The fishermen suppose that the bulk of the herrings remain about the middle of the St. George's Channel and the Irish Sea in deep water, like the pilchard does further south, and that the small shoals they see towards Scilly are merely the outskirts of the mass of the fish. How far south they are found I have been unable satisfactorily to ascertain, but they lie to the north of the pilchard. The boats of Mount's Bay and St. Ives leave Cornwall for the Irish shores about the first week in June ; and their first place of rendezvous is Howth, where the fishery is at its greatest point of success about the last week in June or the first week in July ; after this it decreases, and the boats go further north. From the succession of the fisheries

on different parts of the coasts, it appears that the herrings either go from the south to the north, exactly the reverse of Pennant's views, or, what is far more probable, approach from deep water off the shores on which they appear. The produce of the fishery is very uncertain, for the herring is a capricious fish; but the returns vary from £1200 to £2300 for the month in which they are engaged on it.

The course the herring takes in the St. George's Channel, from the accounts I can procure from the fishermen, is, that in June and July they have a northerly direction, and at that time very few remain near the Cornish shores; and that in September, October, and November, they again come south, and are then caught at St. Ives. This period of their migration north coincides with a similar migration of the pilchard, the habitation of both being north and south of each other. I would call the attention of your readers resident on the Norfolk coasts, to the opinion of their fishermen, that the pilchard of St. Ives and the herring of Yarmouth appear simultaneously. If such should prove to be the case, it will be well worthy of record.

The herring is a more lively fish than the pilchard, and a more rapid swimmer; it wanders more and is more uncertain, according to Dr. McCulloch. As you have readers on all parts of our coast, it would not, perhaps, be difficult to procure accurate information as to the dates of the commencement of the fishery at each station, with notices of the directions in which the fish are moving at the time.

Sprat, C. sprattus. The name of sprat is very vaguely applied by the fishermen of Cornwall to the young of the pilchard, the herring, and I believe of other fish. In the British Channel, or rather on the southern shores of the county, it is very rare, being only occasionally taken: on the northern coast it is more common, though it is not abundant. It may, however, be on our shores more frequently than we can detect, since we have no nets calculated to take them. They assemble in small shoals on the north-eastern parts about December and January.

Whitebait, C. alba. Not found in the district of the Land's End, but it occurs in the Fowey River.

Twaite Shad, Alosa finta. Damin-herring. This fish frequents Mount's Bay and the western parts of Cornwall generally, in rather large numbers, towards the latter part of the summer pilchard-fishery, and early in the autumnal mackerel-fishery. They are frequently caught in the mackerel drift-nets off Scilly, and are considered by the fishermen as a mongrel kind of herring. At the time they are caught,

they are moving to the east or north-east, being taken on the western side of the nets. The largest quantities pass up the northern shores. They are held in no estimation as food, and sell at a very low price.

Allice Shad, *A. communis*. Damin-herring. Equally common with the twaite shad, but approaches the shore earlier.

Anchovy, *Engraulis encrasicolus*. Not at all uncommon towards the latter part of summer and early in the autumn. Very large specimens are sometimes taken in the pilchard drift-nets. I have seen one eight inches long, and many varying from five to seven and a half inches. It approaches the shores somewhat earlier than the pilchard, and continues in shallow water till October and November. Whether they are sufficiently numerous to warrant the establishment of a fishery remains to be discovered; and the mesh of the drift-nets are too large to determine the point. Some of the small "schulls" of what the fishermen call sprats have proved to belong to the anchovy. They have been taken in March in Mevagissey Bay; but at present very little is known of their movements.

R. Q. COUCH.

Penzance.

The Sea Serpent.—On the 15th of May, 1833, a party, consisting of Captain Sullivan, Lieutenants Maclachlan and Malcolm of the Rifle Brigade, Lieutenant Lyster of the Artillery, and Mr. Ince of the Ordnance, started from Halifax in a small yacht for Mahone Bay, some forty miles to the westward on a fishing excursion. The morning was cloudy, and the wind at S.S.E. and apparently rising; by the time we reached Chebucto head, as we had taken no pilot with us, we deliberated whether we should proceed or put back, but after a consultation we determined on the former, having lots of ports on our lee. Previously to leaving town, an old man-of-war's-man we had along with us busied himself in inquiries as to our right course: he was told to take his departure from the Bull Rock off Pennant Point, and that a W.N.W. course would bring us direct on Iron Bound Island at the entrance of Mahone or Mecklenburgh Bay; he, however, unfortunately told us to steer W.S.W., nor corrected his error for five or six hours; consequently we had gone a long distance off the coast. We had run about half the distance, as we supposed, and were enjoying ourselves on deck smoking our cigars, and getting our tackle ready for the approaching campaign against the salmon, when we were surprised by the sight of an immense shoal of grampuses, which appeared in an unusual state of excitement, and which, in their gambols approached so close to our little craft that some of the party amused themselves by firing at them with rifles: at this time we were jogging on at about five miles an hour, and must have been crossing Margaret's Bay: I merely conjecture where we were, as we had not seen land since a short time after leaving Pennant Point. Our attention

was presently diverted from the whales and "such small deer" by an exclamation from Dowling, our man-of-war's-man, who was sitting to leeward, of, "Oh! Sirs, look here!" we were started into a ready compliance, and saw an object which banished all other thoughts save wonder and surprise.

At the distance of from 150 to 200 yards on our starboard bow we saw the head and neck of some denizen of the deep, precisely like those of a common snake, in the act of swimming, the head so far elevated and thrown forward by the curve of the neck as to enable us to see the water under and beyond it. The creature rapidly passed, leaving a regular wake, from the commencement of which to the fore part, which was out of water, we judged its length to be about eighty feet; and this is within rather than beyond the mark. We were of course all taken aback at the sight, and with staring eyes and in speechless wonder stood gazing at it for full half a minute: there could be no mistake, no delusion, and we were all perfectly satisfied that we had been favoured with a view of the "true and veritable sea serpent," which had been generally considered to have existed only in the brain of some Yankee skipper, and treated as a tale not much entitled to belief. Dowling's exclamation is worthy of record, "Well, I've sailed in all parts of the world, and have seen rum sights too in my time, but this is the queerest thing I ever see,"—and surely Jack Dowling was right. It is most difficult to give correctly the dimensions of any object in the water. The head of the creature we set down at about six feet in length, and that portion of the neck which we saw, at the same; the extreme length, as before stated, at between eighty and one hundred feet. The neck in thickness equalled the bole of a moderate sized tree. The head and neck of a dark brown or nearly black colour, streaked with white in irregular streaks. I do not recollect seeing any part of the body.

Such is the rough account of the sea serpent, and all the party who saw it are still in the land of the living,—Lyster in England, Malcolm in New South Wales with his regiment, and the remainder still vegetating in Halifax.

<i>W. Sullivan, Captain,</i>	<i>Rifle Brigade,</i>	<i>June 21st, 1831.</i>
<i>A. Maclachlan, Lieutenant,</i>	<i>Ditto,</i>	<i>August 5th, 1824.</i>
<i>G. P. Malcolm, Ensign,</i>	<i>Ditto,</i>	<i>August 13th, 1830.</i>
<i>B. O'Neal Lyster, Lieutenant,</i>	<i>Artillery,</i>	<i>June 7th, 1816.</i>
<i>Henry Ince, Ordnance Store-keeper, at Halifax.</i>		

[The dates are those on which the gentlemen received their respective commissions. I am not aware of their present rank. I am indebted to Mr. W. H. Ince for this interesting communication: this gentleman received it from his brother, Commander J. M. R. Ince, R.N. It is written by their uncle, Mr. Henry Ince, the Ordnance Store-keeper at Halifax, Nova Scotia.—*Edward Newman*.]

The Sea Serpent.—Not long since the 'Boston Daily Advertiser' announced a new appearance of this marine monster, about whose existence the world is so naturally incredulous. A French captain has just related to us a remarkable circumstance, which he has himself witnessed, and his recital exhibits a degree of cautious reserve, which is well calculated to shake the obstinacy of the most sceptical. We shall preface his narrative by the remark that the sea serpent has been recently alleged to have been seen at different points along the whole line of the American coast. Captain D'Abnour, commander of the *Ville de Rochefort*, makes the following statement:—

"On the 21st of April, 1840, while we were in 24 deg. 13 min. N. latitude, and 89 deg. 52 min. W. longitude (calculated from the meridian of Paris), in the gulf of Mexico, we were running under a light breeze from E.N.E. with beautiful weather.

In a few hours we distinguished something like a long chain of rocks, falling off by a gentle inclination at the two extremities, and elevated at the middle by only a few feet over the level of the sea. Against this object the sea broke softly. As we approached, we remarked that its different parts changed their position, and even their form, and we became perfectly certain that it was not a reef. A little later, we distinguished by the assistance of a telescope a long chain of enormous rings, resembling a number of barrels linked together, and in form very like the back of a silk-worm. It was a three-quarter view of the object which we had first obtained. As the ship approached, these appearances became more distinct, and we presently saw the extremity of an enormous tail, longitudinally divided into two sections, white and black. This tail appeared to wind itself up, and repose on a part of the object itself. Then, at the other extremity, we saw a membrane rising to the height of about two *metres* from the water, and inclining itself at a considerable angle upon the mass (without leaving it, however); and this led me to conjecture that the monster before us was provided with an apparatus for the purpose of respiration, like the lampreys. At last we perceived something like an *antenna* rising from the water, to the great height of nearly eight *metres*, terminated by a crescent of at least five *metres* from one extremity to the other. We could not approach sufficiently near to acquire any very positive idea as to what we had seen; but everything led us to believe that it was an enormous serpent of at least 100 *metres* in length."—*Journal du Havre*, Sept. 15th, 1840.

Animal Life in the Peruvian Forests.—"Unlike the peaceful repose which presides over animal life on the level heights, are the constant aggressions and combats which prevail in the forest regions. There the strong attack the weak, and the cunning inveigle the unwary: strength and intelligence, caution and instinct, are unceasingly in active operation. The variegated forms and colours which meet the eye, and the multifarious cries and tones which resound through the woods, form, altogether, the most singular contrasts. The gold-feathered colibri hums lightly through the air, soaring over the heavy, sombre-coloured tapir. The sprightly singing bird pours forth his melodious chants amidst the thick foliage of the aged trees, whilst the fierce ounce, prowling for his prey, growls as he passes over their enormous, spreading roots. Slowly do the eye and the ear learn to distinguish individuals in the vast mass of apparent chaotic confusion, and to recognise quickly fleeting forms, or distant resounding sounds.

"The whole of the animal world is here developed to the view, and it would be difficult to assign the predominance to any one class. Yet, perhaps, the variegated feathered tribe is relatively most extensively represented. The number of the Mammalia is also important. They are seldom seen by the hunter during the day, but twilight draws them from their hiding-places.

"Troops of monkeys skip from tree to tree, looking timidly around, and uttering mournful howls. Among them are swarms of the black marimonda (*Ateles*), with slender long arms and red-brown or black faces; in some the faces are encircled with white hair (*Ateles marginatus*, Geoff.), which gives them a striking resemblance to an old negro. Next is seen a group of silver-gray monkeys (*Lagothrix Humboldtii*, Geoff.), stalking over heaps of broken branches and twigs in search of a resting-place.

These monkeys, which are the largest in South America, are about three feet high, and are bold and vicious. When wounded they take a position of defence against the hunter, struggling, and uttering loud cries, upon which their companions hasten down from the trees to assist them. But soon a short stifled cry is heard; it is the cry of mortal convulsion. That sound drives them instantly back, and they disperse in wild flight. The sly sayu ventures to approach the dwellings of men, where he plunders maize-fields with incredible dexterity. The delicate silky-haired monkey, shivering at every cool breeze or shower of rain, and starting at the slightest noise, creeps for shelter into the thicket, where he lies peeping with his penetrating eyes in the direction of the apprehended danger.

“At sunset swarms of bats flutter through field and forest in all directions, and greedily devour the insects which in the twilight awaken to full activity. Some of these bats (*Phyllostoma hastatum*, Geoff.) are remarkable for their expanse of wing, which measures nearly two feet. Others are distinguished for ugliness, and for their offensive smell. These latter fly into the Indian huts at night, and greatly annoy the inhabitants, who cannot get rid of them by fire or smoke, or any other means, until at the midnight hour they retire of their own accord. Not less troublesome are the leaf-nosed bats (*Phyllostoma*), which attack both man and beast. This bat rubs up the skin of his victim, from which he sucks the blood. The domestic animals suffer greatly from the nocturnal attacks of these bats, and many are destroyed by the exhaustion consequent on the repeated blood-sucking. The blood drawn by the bat itself does not exceed a few ounces; but if, when satisfied, it drops down to the ground, or flies away, the wound continues to bleed for a long time, and in the morning the animal is often found in a very weak condition, and covered with blood. One of my mules, on which a leaf-nosed bat made a nightly attack, was only saved by having his back rubbed with an ointment made of spirits of camphor, soap, and petroleum. The blood-suckers have such an aversion to the smell of this ointment, that on its application they ceased to approach the mule. These bats are very mischievous in the plantations of the forests, where beasts of burthen and horned cattle are exposed to their attacks. Whether they venture to assail man has been a much-disputed question. Several travellers declare that they do not. I may, however, mention a case which occurred within my own knowledge. A bat (*Ph. erythromos*, Tsch.) fastened on the nose of an Indian lying intoxicated in a plantation, and sucked so much blood that it was unable to fly away. The slight wound was followed by such severe inflammation and swelling that the features of the cholo were not recognisable.

“Many beasts of prey, and among them some of formidable strength and fierceness, make havoc among the other animals of the forests. In the more lofty mountains the black bear (*Ursus frugilegus*, Tsch.) roams as wild as his fellow-depredator of the Cordillera. He often enters the maize-fields of the Indians, breaks the stalks of the plants, and drags the green tops away to his hole. When this bear cannot obtain his customary vegetable food, consisting chiefly of the fruits of a pandanea, (*Phytelephas*), he watches for the deer and wild boars, or attacks the oxen employed to turn the machinery in the sugar-mills; he has even been known to assail solitary travellers. The lively coatis traverse the forests in flocks. They collect round the roots of trees and search for the larvæ of insects; light-footed, they climb up bush and tree to find birds' nests, and feast on the eggs and the young. With a monotonous howl, not unlike that made by some dogs on a clear moonlight night, the yellow-breasted glutton (*Galictis barbara*, Wieg.), the omeyro of the Indians, announces his presence. But

the most fierce of all these wild forest animals are those of the feline class. The spotless dark-gray yaguarundi, not much larger than the wild cat of Europe, pursues all kinds of birds, particularly the pigeon, the partridge, and the penelope. The oscollo (*Felis celidogaster*, Tem.), the uturunca (*F. pardalis*, L.), and the long-tailed, yellowish-gray tiger-cat (*F. macroura*, Pr. Max.), all lie in wait, not only for the weaker Mammalia, but sometimes they even venture into the plantations and kill dogs and poultry. The maneless Mexican lion (the puma), roams through the upper regions of the forest, where he has almost undisputed hunting-ground. He fearlessly assails victims who cannot effectually defend themselves, such as the horse, the mule, and the ass, and he tears large pieces of flesh from their ribs; but he does not venture to meddle with oxen. He shuns men, and in the forest he even flies from the unarmed Indian. I fired at a very large puma, which immediately fled, roaring loudly. When severely wounded and driven into a corner, this animal frequently commences a combat of despair, and sometimes kills the hunter. The puma measures in length about four feet, and in height more than two feet. More direful than any of the felines mentioned above is the sanguinary ounce,* which possesses vast strength, and is of a most savage disposition. Though the favourite haunts of this animal are the expansive pajonales, yet he frequently takes up his abode in the vicinity of villages and plantations, spreading terror among the inhabitants. Far from being intimidated at the sight of man, he often attacks individuals; and when pressed by hunger is not afraid, even in broad daylight, to slip into the forest villages in order to carry off food, and the booty, when once seized, is not easily recovered.

"An amusing example of this occurred in the Montana of Vitoc. An Indian one night heard his only pig squeaking loudly, as if in pain. He hastened to the door of his hut to see what was the matter, and he discovered that an ounce had seized the pig by the head, and was carrying it off. The cholo, who determined to make an effort to recover his property, seized the pig by the hind-legs, and endeavoured to drag it from the grasp of the robber. This contest was kept up for some time, the ounce, with his eyes glaring in the darkness, holding fast the head of the pig, and the Indian pulling it hard by the legs. At length the Indian's wife came to the door of the hut with a lighted faggot, and the scared ounce, with terrible howlings, slowly retired to the forest. In general the Indians have a great dread of these animals, and seldom venture singly into the parts they frequent. The ounce-hunter is the only one who ventures to approach them. He is armed with a long spear, with which he gives the ferocious animal a death-blow. He lets the ounce come within a few paces of him without making the least show either of flight or attack. If, however, the stroke he aims does not immediately reach the seat of life, the hunter, in general, becomes the victim of his bold attempt. Before he can stand on his defence, the wounded ounce drags him to the ground, and tears the flesh from his bones.

"Sometimes the villagers collect their dogs together for a general hunt. They drive the ounce into a place from whence there is no escape, or often up a tree, where they shoot him with long arrows sent from their bows or blow-tubes. In a few places snares are laid, or large holes are dug, and a sharp-pointed stake is stuck in the middle, covered with stalks and branches of trees, on which the bait is laid. The ounce is,

* The Indian name for this animal is *chaque chinca*. The black variety, *yana chinca*, is called by the Spaniards *tigre* or *yaguar*.

however, too cunning to be easily caught in traps, and it is only when pressed by hunger that he can be tempted by a bait. In some districts the ounces have increased so greatly, and done so much damage, that the natives have been compelled to remove and settle in other places. I need only refer to the quebrada of Mayumarca, in the Montana of Huanta, near the road to Anca. There once stood the little village of Mayumarca, which has been abandoned for more than a hundred years, as it was found that the jaguars annually decimated the inhabitants: this quebrada is still in such bad repute that not a single Indian will venture into it.

"There is a black variety of the ounce, by many erroneously regarded as a distinct species. It has the identical marks of the common jaguar, or ounce, only its colour is a dark, blackish-brown, whereby the whole of the black spots are rendered indistinct. On the lower banks of the Ucayali and the Marañon this dark variety is more frequently met with than in the higher forests; in the Montanas of Huanta and Urbamba it is also not uncommon. It is upon the whole larger, stronger, and more daring than the lighter kind, and I have actually seen many black skins which exceeded the usual length; but of specific distinctions there is no indication. The superstitious Indians assign extraordinary powers to everything that departs from the common course; the black ounce is, accordingly, supposed to possess singular properties. The yana chinca holds a prominent place in the religious ceremonies of some of the Indian races.

"Turning from these fierce natives of the forests, we will now take a glimpse at the peaceful inhabitants of those umbrageous regions. In the hollow stems of trees, or among their canopied branches, are found the timid marsupial animals (*Didelphis impavida* and *noctivaga*, Tsch.). These animals remain in obscure holes until the sun sinks beneath the horizon, when they slip out in search of insects and fruit. Not frequently they penetrate into the slightly guarded Indian huts, creeping into every corner, until at last they are caught in traps baited with pieces of banana and pineapple. The lofty Terebinthaceæ, with their walnut-like fruit, are inhabited by swarms of squirrels, which strongly remind the European of his own woods. Numbers of the mouse family, from the small tree-mouse (*Dryomys parvulus*, Tsch.) to the large, loathsome, spinous rat (*Echinomys leptosoma*, Wagn.), swarm over all the montanas, and love to approximate to the dwellings of man. These animals destroy the gathered harvest, and even in these remote regions they become a plague. It is a striking fact, that certain animals are almost inseparable from man. They keep with him, or follow him wherever he settles. The mouse genus is one of these. On the coast mice are not the same as on the mountains, and in the forests they are again different. Everywhere they leave their original dwelling places, which they exchange for an abode with man. As the mouse and the rat attack the gathered fruits of the earth, the agouti preys on those yet standing in the field. These animals are seldom found in the depths of the forest, but more frequently on its edge, near the chacras of the Indians. Shortly before sunset they leave the thickets, and stealthily repair to the maize, yucca, and anana fields, where they scratch up the root and eat the grain and fruit; but the slightest noise drives them back to their holes. In the deeper recesses of the forest resounds the monotonous, drawling cry of the sloth. Here we have a symbol of life under the utmost degree of listlessness, and of the greatest insensibility, in a state of languid repose. This emblem of misery fixes itself on an almost leafless bough and there remains defenceless, a ready prey to any assailant. Better defended is the scale-covered armadillo, with his coat of mail. Towards

evening he burrows deep holes in the earth, and searches for the larvæ of insects, or he ventures out of the forest, and visits the yucca fields, where he digs up the well-flavoured roots. The ant-eater rakes up with his long curved claws the crowded resorts of ants, stretches out his long, spiral, and adhesive tongue, into the midst of the moving swarm, and draws it back covered with a multitude of crawling insects.

"In the soft marshy ground, or in the damp shady recesses of the forests, the heavy tapir reposes during the heat of the day; but when the fresh coolness of evening sets in, he roves through the forest, tears the tender twigs from the bushes, or seeks food in the grass-covered pajonales. Sometimes a multitude of tapirs sally from the forests into the cultivated fields, to the great alarm of the Indians. A broad furrow marks the tract along which they have passed, and the plants they encounter in their progress are trampled down or devoured. Such a visit is particularly fatal to the coca fields; for the tapirs are extremely fond of the leaves of the low-growing coca-plant, and they often, in one night, destroy a coca-field which has cost a poor Indian the hard labour of a year.

"Flocks of the umbilical hog, or peccary, traverse the level montanas. If one of them is attacked by the hunter, the whole troop falls furiously on him, and it is only promptly climbing up a tree that he can escape; then, whizzing and grunting, they surround the stem, and with their snouts turn up the earth round the root, as if intending to pull down the tree and so get at their enemy. The stag lurks in the thicket to withdraw from the eyes of the greedy ounce; but towards evening he leaves his hiding-place, and sometimes strays beyond the boundary of the forest; he ventures into the maize-fields of the plantations, where he tarries until night is far advanced.

"The same diversity of nature and habits is seen in the numerous hosts of birds that inhabit the leafy canopies of the forest. On the loftiest trees, or on detached rocks, eagles, kites, and falcons, build their eyries. The most formidable of these birds of prey, both for boldness and strength, the *Morphnus harpyia*, Cab., darts down on the largest animals and fears not to encounter the fiercest inhabitant of the forest. The owls (*Noctua*, *Scops*, *Strix*), and the goat-milkers (*Caprimulgus*, *Hydropsalis*, *Chordiles*), fly with softly flapping wings to their hunting quarters, to surprise their victims whilst asleep. In the hilly parts of the montanas the black ox-bird (*Cephalopterus ornatus*, Geoff.), the toropishu of the Indians, fills the forest with his distant bellow, similar to the roaring of a bull. The tunqui* inhabits the same district. This bird is of the size of a cock; the body is bright red, but the wings are black. The head is surmounted by a tuft of red feathers, beneath which the orange bill projects with a slight curve. It lives sociably with other birds, in thickets, or among cinchona-trees, the fruit of which is part of its food. Its harsh cry resembles the grunt of the hog, and forms a striking contrast to its beautiful plumage. Numberless fly-catchers and shrikes (*Muscicapidæ* and *Laniadæ*) hover on tree and bush, watching for the passing

* *Rupicola peruviana*, Ch. Dum. The colour of the female is reddish-brown, and she is named by the natives *tunqui mulato*; the male is called *tunqui colorado*. In some parts of the montanas the *Cephalopterus ornatus* is called *yana tunqui*. Thus even the Indians have observed the relationship of these birds, which, classed according to our system of Natural History, actually belong to one family, the Ampelidæ. Their affinity is indicated very correctly by the Indian name.

insects, which they snatch up with extraordinary dexterity. Finches twitter on the summits of the loftiest trees, beyond the reach of the hunter's shot: they are distinguished, like the *Ampelidæ*, who, however, live amongst the lower bushes, by the lively and almost dazzling colours of their feathers. In modest plumage of cinnamon-brown, with head and neck of dark olive, the organista* raises, in the most woody parts of the forest, her enchanting song, which is usually the prognostic of an approaching storm. The tender, melancholy strains, and the singular clearness of the innumerable modulations, charm the ear of the astonished traveller, who, as if arrested by an invisible power, stops to listen to the syren, unmindful of the danger of the threatening storm. On old decayed stumps of trees the busy creeper† and the variegated woodpecker are seen pecking the insects from under the loose bark, or by their tapping bring them out of their concealed crevices; while the red-tailed potter-bird (*Opetiorynchus ruficaudus*, Pr. Max.) builds his dwelling of potter's clay, or loam, as firmly as if it were destined to last for ever. The pouched starlings‡ hang their nests, often four or five feet long, on the slender branches of trees, where they swing to and fro with the slightest breath of wind. Like a dazzling flash of coloured light the colibri (humming-bird) appears and disappears. No combination of gorgeous colouring can exceed that which is presented in the plumage of the golden-tailed humming or fly-bird (*Trochilus chrysurus*, Cuv.) which haunts the warm primæval forests, but it is still more frequently found in the pure atmosphere of the ceja-girded montanas. The silky cuckoo (*Trogon heliothrix*, Tsch.) retires into the thickest masses of foliage, from which its soft rose-coloured plumage peeps out like a flower. The cry of the voracious chuguimbis§ accompanies the traveller from his first steps in the montanas to his entrance into the primæval forests, where he finds their relative, *Dios te de*|| This bird accompanies its significant cry by throwing back its head, and making a kind of rocking movement of its body. The Indians, who are always disposed to connect superstitious ideas with the natural objects they see around them, believe that some great misfortune will befall any one who may shoot this bird, because it utters the sacred word *Dios*. Long trains of green parrots fill the air with their noisy chattering. One kind of these birds (*Psittacus mercenarius*, Tsch.) is remarkable for regular migrations. Every morning they sally forth in flocks from the upper to the lower forests, where they pass the day, and they regularly return before sunset to their roosting-places. From year to year these parrots leave their night quarters daily at the same

* The organistas of Peru, Brazil, and Guiana, &c., mentioned by so many travellers, all belong to the family of the *Troglodytinæ*, to the two genera, *Troglodytes*, Viell., and *Cyphorhinus*, Cab. The Peruvian organista above alluded to is the *Troglodytes leucophrys*, Tsch. In Guiana it appears to be the *Cyphorhinus carinatus*, Cab.

† *Xenops*, *Anabates*, *Dendrocolaptes*, and many other kinds of *Capito* and *Picus*.

‡ These are different kinds of *Cassicus* and *Icterus*.

§ Kinds of *Pteroglossus* Those most frequently met with in the montanas are the *Pt. atrogularis*, Sturm.; *Pt. cæruleocinctus*, Tsch. (*Aulachorhynchus*, Orb.); and *Pt. Derbianus*, Gould.

|| *Dios te de*, signifies 'May God give it thee.' The sound which is interpreted, *Dios te de*, resembles very much the cry of most of the toucans, or pepper-eaters.

hour, and return with equal punctuality before sunset. This regularity of departing and returning has caused the natives to give them the name of *jornaleros* 'day-labourers.' From the depth of the forest sounds often arise which resemble human voices, and the astonished hunter then believes that he is in the vicinity of his companions, or, perhaps, of hostile Indians. He eagerly listens, and it is only when well acquainted with the sounds of the winged inhabitants of the woods that he can recognise the melancholy tones of the wood-pigeons (*C. infuscata*, Licht., *C. melancholica*, Tsch.). When day begins to depart, groups of the pheasant-like hachauallpa* assemble, and with the cry of *ven acá*,† *ven acá*, summon their distant companions.

"Not only are the trees of the forests peopled with myriads of birds, but the earth has also its feathered inhabitants, who seldom soar above the level of the soil. They build their nests among the roots and fallen branches, and depend for movement more on their feet than on their wings. Among those members of the winged tribe who show no disposition to soar into the regions of air, we find here the turcassa, a pigeon with richly shaded plumage; the beautifully speckled-tooth fowl (*Odontophorus speciosus*, Tsch.), and short-tailed grass-fowl or crane,‡ whose flesh when cooked is delicately white and finely flavoured. In marshy places and on the slimy banks of rivers, the jabiru (*Mycteria americana*, L.), loves to wade, together with the rose-coloured spoonbill (*Platalea ajaja*, L.), the fish-devouring ibis (*Tantalus loculator*, L.), the curved-billed snipe (*Rynchœa Hilarea*, Val.), the parti-coloured cranes, plovers, land-rails, shrikes, and even sea-swallows.§ In the rivers there are ducks: these birds are, perhaps, carried down by the currents from the Andes, or, possibly, they fly in great trains from the inner waters of Brazil.

"Of the Amphibia in the principal forests of Peru, only the great fresh-water tortoise (*Hydraspis expansa*, Fitz.), is useful to the natives. On the sandy banks of rivers this animal buries its eggs, from which the Indians extract oil: its flesh, also, supplies well-flavoured food. All other animals of this class are objects of terror, or at least of aversion, to the Indians. In the warm sand of the river-banks, lies the lazy caiman.|| He keeps his jaws wide open, only closing them to swallow the innumerable flies which he catches on his tongue. To the helplessness of these animals when on land, the natives have to be thankful that they are not the most dangerous scourges of the forest: in water, their boldness and swiftness of motion are fearful. The number of lizards here is not great, nor do they attain so considerable a size as in the other equatorial regions. The serpents are to be feared, and on approaching them it is not easy to decide at the first view whether they belong to a poisonous or innoxious species. In the forests, where the fallen leaves lie in thick, moist layers, the foot of the hunter sinks deep at every step. Multitudes of venomous Amphibia are hatched in the half-putrescent vegetable matter, and he who inadvertently steps on one of these animals may consider himself uncommonly fortunate if he can effect his retreat

* Several kinds of *Penelope*.

† The cry of this bird closely resembles the Spanish words *ven acá*, 'come hither.'

‡ Seven species of *Crypturus*.

§ *Sterna erythrorhynchos*, Prince Max. *St. magnirostris*, Licht.

|| *Champosa fissipes*, *sclerops* and *nigrâ*, Wagl.

without being wounded. But it is not merely in these places, which seem assigned by nature for their abode, that loathsome reptiles are found: they creep between the roots of large trees, under the thickly interwoven brushwood, on the open grass plots, and in the maize and sugar-cane fields of the Indians; nay, they crawl even into their huts, and most fortunate is it for the inhabitants of those districts that the number of the venomous, compared with the innoxious reptiles, is comparatively small. Of the poisonous serpents, only a few kinds are known whose bite is attended with very dangerous consequences. The *miuamaru* or *jergon* (*Lachesis picta*, Tsch.), is, at most, three feet long, with a broad, heart-shaped head, and a thick upper lip. It haunts the higher forests, while in those lower down his place is filled by his no less fearful relative *flammon* (*Lachesis rhombeata*, Prince Max.), which is six or seven feet in length. These serpents are usually seen coiled almost in a circle, the head thrust forward, and the fierce, treacherous-looking eyes glaring around, watching for prey, upon which they pounce with the swiftness of an arrow; then, coiling themselves up again, they look tranquilly on the death-struggle of the victim. It would appear that these Amphibia have a perfect consciousness of the dreadful effect of their poisonous weapon, for they use it when they are neither attacked nor threatened, and they wound not merely animals fit for their food, but all that come within their reach. More formidable than the two snakes just described, but happily much less common, is the brown ten-inch long viper.* It is brown, with two rows of black circular spots. The effect of its bite is so rapid that it kills a strong man in two or three minutes. So convinced are the natives of its inevitably fatal result, that they never seek any remedy; but immediately on receiving the wound lay themselves down to die. In the montanas of Pangoa this viper abounds more than in any other district; and never without apprehension do the cholos undertake their annual journey for the coca harvest, as they fear to fall victims to the bite of this viper. The warning sound of the rattle-snake is seldom heard in the hot montanas, and never in the higher regions.

"Nature, who in almost all things has established an equilibrium, supplies the natives with remedies against the bite of the serpent. One of the cures most generally resorted to is the root of the *amarucachu* (*Polianthes tuberosa*, L.), cut into slips and laid upon the wound. Another is the juice of the creeping plant called *vejuco* (*Mikania huaco*, Kth.), which is already very widely celebrated. This latter remedy was discovered by the negroes of the equatorial province, Choco. They remarked that a sparrow-hawk, called the *huaco*, picked up snakes for his principal food, and when bitten by one it flew to the *vejuco* and ate some of the leaves. At length the Indians thought of making the experiment on themselves, and when bitten by serpents they drank the expressed juice of the leaves of the *vejuco*, and constantly found that the wound was thereby rendered harmless. The use of this excellent plant soon became general; and in some places the belief of the preservative power of the *vejuco* juice was carried so far that men in good health were inoculated with it. In this process some spoonfuls of the expressed fluid are drunk, and afterwards some drops are put into incisions made in the hands, feet, and breast. The fluid is rubbed into the wounds by fresh *vejuco* leaves. After this operation, according to the testimony of persons worthy of credit, the bite of the poisonous snake fails for a long time to have

* *Echidna ocellata*, Tsch. This is the only species of the viper family belonging to South America, as yet known.

any evil effect. Besides the two plants mentioned above, many others are used with more or less favourable results. The inhabitants of the montana also resort to other means, which are too absurd to be detailed here; yet their medicines are often of benefit, for their operation is violently reactive. They usually produce the effect of repeated emetics, and cause great perspiration. There is much difference in the modes of external treatment of the wound, and burning is often employed. I saw an Indian apply to his wife's foot, which had been bitten, a plaister, consisting of moist gunpowder, pulverized sulphur, and finely-chopped tobacco, mixed up together. He laid this over the wounded part and set fire to it. This application, in connexion with one of the nausea-exciting remedies taken inwardly, had a successful result.

"Innoxious* snakes wind on tendriled climbing plants, or lie like necklaces of coral on the brown decayed leaves (*Elaps affinis*, Fitts.). Where the branches of rivers enter the gloomy forests and form little narrow lagunes, over which the high trees spread in vaulted cupolas, almost impervious to the light of day, there dwells the powerful giant snake (*Eunectes murinus*, Wagl.), called by the Indians, in their figurative language, *yacumamam*, 'mother of the waters.' Stretched in listless repose, or winding round the stem of an old tree bathing her tail in the cool lagune, she watches wistfully for the animals of the forest who come to the waters to quench their thirst. Whilst she gazes at her distant prey, the fascinating power of her eyes seems to subdue the trembling victim, and, unable even to attempt escape, he falls an easy sacrifice.

"The Amphibia of the frog species, which lie concealed in silent repose during the day, raise, after sunset, their far-sounding voices. The violet coloured throat-bladder (*Cystignathus sylvestris*, Tsch.) maintains his loud, uniform croak beneath the bushes, or penetrates into the huts of the inhabitants. The *trapichero*, or 'sugar-mill frog,' is a large species, almost half a foot in length. Its croak resembles very much the grating sound caused by the working of a sugar-mill, for which reason the natives have given it the name of *trapichero*, or the 'sugar-miller.' The croaking of these frogs, whose manifold tones blend together in confused union, augments not a little the distressing dreariness of a forest night.

"Of the numerous species of insects which swarm in these regions, few are remarkable for beauty; but many fix attention by their peculiar habits. The bites and stings of numbers of them are very dangerous, and it requires much caution to guard against their attacks.

"Variegated butterflies flutter noiselessly among the spreading branches of the trees, or sun themselves on the warm masses of fallen leaves. The most remarkable of these butterflies is the large Atlas, whose brilliant blue tints shine out with lustrous radiance in the dim light of the forest. Along the banks of rivers, and especially in hot marshy pots, small mosquitoes swarm. The bite of this animal produces an intolerable burning sensation, and often causes considerable inflammation. But more troublesome and also much more numerous, are the *sancudos*, or 'stinging-flies.' On my first arrival in the montana, I lay several days exceedingly ill, in consequence of severe swelling of the head and limbs, caused by the bites of these insects. To the

* *Sphenocephalus melanogenys*, Tsch.; *Lygophis reginæ*, Wagl.; *L. taniurus*, Tsch.; *L. elegans*, Tsch.

inhabitants of the forest the sancudos are an incessant torment. In no season of the year, in no hour of the day or night, is there any respite from their attacks. Rubbing the body with unctuous substances, together with the caustic juices of certain plants, and at night enclosing one's self in a tent made of *tucuyo*, or 'cotton cloth,' or palm-tree bast, are the only means of protection against their painful stings. The clothes commonly worn are not sufficient, for they are perforated by the long sting of the larger species, particularly of the much-dreaded *huir-pasimi-sancudo*, or 'lip-gnat.' Regularly every evening at twilight fresh swarms of these mischievous insects make their appearance.

"The ticks (*Ixodes*) are a class of insects destined by nature for the suction of plants; but they often forsake trees, shrubs, and grasses, to fasten on man and other animals. With their long sharp stings they make punctures, in which they insert their heads, and thereby occasion very painful sores. These insects appear to have no preference for any particular class of animals. They are often found on the hair of dead Mammalia, and among the feathers of birds which have been shot; even the toad, the frog, and the scaly lizard, are not spared by them. Much more troublesome than these insects are the antanas, which are not visible to the naked eye. They penetrate the surface of the skin, and introduce themselves beneath it, where they propagate with incredible rapidity; and when some thousands of them are collected together, a blackish spot appears, which quickly spreads. If these insects are not destroyed when they first introduce themselves into the punctures, they multiply with incalculable rapidity, destroying the skin, and all the tender parts in contact with it. Washing with brandy, which is often found to be a remedy against the less mischievous isancos, is not sufficient for the removal of the antanas. For their extirpation the only effectual remedy is frequently bathing the part affected with a mixture of spirits of wine and corrosive sublimate.

"Who can describe the countless myriads of ants which swarm through the forests? Every shrub is full of creeping life, and the decayed vegetation affords harbour for some peculiar kinds of these insects. The large yellow *puca çici* is seen in multitudes in the open air, and it even penetrates into the dwellings. This insect does not bite, but its crawling creates great irritation to the skin. The small black *yana çici*, on the contrary, inflicts most painful punctures. A very mischievous species of stinging ant is the black *sunchiron*. This insect inflicts a puncture with a long sting, which he carries in the rear of his body. The wound is exceedingly painful, and is sometimes attended by dangerous consequences. My travelling companion, C. Klee, being stung by one of these ants, suffered such severe pain and fever that he was for a short while delirious. A few nights afterwards, a similar attack was made on myself during sleep. It suddenly awoke me, and caused me to start up with a convulsive spring. I must confess that I never, in my whole life, experienced such severe pain as I did at that moment.

"A most remarkable phenomenon is exhibited by the swarms of the species called the *naii-huacan-çici*,* 'the great wandering ant.' They appear suddenly in trains of countless myriads, and proceed forward in a straight direction, without stopping. The small, the weak, and the neuters are placed in the centre, while the large and the

* From *naii*, 'the eye,' *huacay*, 'to cry,' and *çici*, 'the ant;'—so called by the Indians, because the pain of its numerous stings brings tears into the eyes.

strong flank the army, and look out for prey. These swarms, called by the natives *chacus*, sometimes enter a hut and clear it of all insects, Amphibia, and other disagreeable guests. This work being accomplished, they again form themselves into a long train, and move onwards. The united force of these small creatures is vast, and there is no approach to the fabulous, when it is related that not only snakes, but also large Mammalia, such as agoutis, armadillos, &c., on being surprised by them are soon killed. On the light dry parts of the higher montanas we find the large conical dwellings of the Termes so firmly built, that they are impenetrable even to rifle-shot. They sometimes stand singly, sometimes together, in long lines. In form they strongly resemble the simple, conical Puna hats.

“Before leaving the animal kingdom of these forest regions, which I have here sketched only briefly and fragmentally, I must notice two insects, the cucaracha and the chilicabra, species of the cockroach (*Blatta*). They are exceedingly numerous and troublesome. The cucaracha, which more particularly infests the deep regions of the forest, is an inch and a half long, and above half an inch broad; it is reddish-brown, with a yellow neck. The chilicabra, though smaller, is more mischievous, by reason of its greater numbers. They settle in the huts, where they destroy provisions, gnaw clothes, get into beds, and into the dishes at meal-time. These insects defy every precaution that can be taken against their tormenting attacks. Luckily, nature has provided enemies for their destruction. Among these is a small reddish-yellow ant, called by the Indians the *pucchu-çiçi*, a useful member of the ant family, for it pursues and destroys the mischievous cockroaches. There is also a very elegant little bird, called the cucarachero (*Troglodytes audax*, Tsch.), which wages war against these insects. On seizing one of them it first bites off the head, then devours the body, and throws away the tough wings. These operations being completed, it hops to the nearest bush, and tunes its melodious song, the sounds of which closely resemble the words *Acabe la tarea!* a name which the Indians give to this bird.* I could yet fill many pages with descriptions of insects which are dangerous or troublesome, and among them are included the jalus, measuring six inches in length, the large black and red scorpion, not forgetting the numerous poisonous wasps and the cicadas. However, those which have been noticed will suffice to afford an idea of the ever-active movements of animal life in the forests.

“Guano, (or according to the more correct orthography, huanu,†) is found on the islands in enormous layers of from thirty-five to forty feet thick. The upper strata are of a grayish-brown colour, which lower down becomes darker. In the lower strata the colour is a rusty red, as if tinged by oxide of iron. The guano becomes progres-

* *Acabe la tarea*, may be translated ‘My task is finished.’ But the Indians are not very consistent in their interpretations of the song of the *cucarachero*; for in some districts, they contend that it repeats the words, *Casa te, soltera*,—‘Go and get married, maiden.’

† The original word is *huanu*, which is a term in the Quichua dialect meaning ‘animal dung;’ for example, *huanacuhwana*, ‘excrement of the huanacu.’ As the word is now generally used, it is an abbreviation of *pishu huana*, ‘bird dung.’ The Spaniards have converted the final syllable *nu* into *no*, as they do in all the words adopted from the Quichua which have the like termination. The European ortho-

sively more and more solid from the surface downward, a circumstance naturally accounted for by the gradual deposit of the strata, and the evaporation of the fluid particles. Guano is found on all the islands, and on most of the uninhabited promontories of the west coast of South America, especially in those parts within the tropics. I have often been assured that beds of guano several feet high, covered with earth, are found inland at some distance from the sea; but I never met with any, and I have some doubt of the correctness of the statement. If, however, these inland strata really exist, I am inclined to believe that they can only be found on hilly ground; and in that case they afford strong evidence of a considerable elevation of the coast.

"Guano is formed of the excrements of different kinds of marine birds, as mews, divers, sheerbeaks, &c.; but the species which I can name with more precision are the following,—*Larus modestus*, (Tsch.), *Rhincops nigra*, (Linn.), *Plotus anHINGA*, (Linn.), *Pelecanus thAYUS*, (Mol.), *Phalacrocorax Gaimardii* and *albigula*, (Tsch.), (*Pelecanus Gaimardii*, Less., *Carbo albigula*, Brandt), and chiefly the *Sula variegata*, (Tsch.)

"The immense flocks of these birds as they fly along the coast appear like clouds. When their vast numbers, their extraordinary voracity, and the facility with which they procure their food, are considered, one cannot be surprised at the magnitude of the beds of guano, which have resulted from uninterrupted accumulations during many thousands of years. I kept for some days a living *Sula variegata*, which I fed abundantly with fish. The average weight of the excrement daily was from three and a half to five ounces. I have no doubt that when the bird is in a state of freedom the weight must be much greater, for these birds are constantly plunging into the sea, in order to devour the fishes which they find in extraordinary masses around all the islands. When an island is inhabited by millions of sea-birds, though two-thirds of the guano should be lost while flying, still a very considerable stratum would be accumulated in the course of a year.

"The marine birds nestle on the uninhabited islands, or on rocks near the shore; but they never settle on the flat beach, or any place distant from it inland. On this fact I ground my conjecture that those beds of guano in the interior, which may have been removed from the shore by important elevations of the coast, are to be found only on hills.

"During the first year of the deposit the strata are white, and the guano is then called *guano blanco*. In the opinion of the Peruvian cultivators, this is the most efficacious kind. It is found in the Punta de Hormillos, on the islands of Islay, Jesus, Margarita, &c.

"As soon as the dealers in guano begin to work one of the beds, the island on which it is formed is abandoned by the birds. It has also been remarked, that since the increase of trade and navigation, they have withdrawn from the islands in the neighbourhood of the ports.

"Much has recently been written on the employment and utility of guano; but the manner in which it is applied as manure in Peru seems to be but little known.

graphy *guano*, which is also followed in Spanish America, is quite erroneous, for the Quichua language is deficient in the letter G, as it is in several other consonants. The H, in the commencement of the word, is strongly aspirated, whence the error in the orthography of the Spaniards, who have sadly corrupted the language of the Autochthones of Peru.

The Peruvians use it chiefly in the cultivation of maize and potatoes. A few weeks after the seeds begin to shoot, a little hollow is dug round each root, and is filled up with guano, which is afterwards covered with a layer of earth. After the lapse of twelve or fifteen hours the whole field is laid under water, and is left in that state for some hours. Of the *guano blanco* a less quantity suffices, and the field must be more speedily and abundantly watered, otherwise the roots would be destroyed. The effect of this manure is incredibly rapid. In a few days the growth of a plant is doubled. If the manure be repeated a second time, but in smaller quantity, a rich harvest is certain. At least, the produce will be threefold that which would have been obtained from the unmanured soil.

"The haciendas of the valley of Chancay have, during the last fifty years, consumed annually from 33,000 to 36,000 bushels of guano brought from the islands of Chancha and Pisco. The price of the bushel of coloured guano is one dollar and a quarter, and the price of the white from two to three dollars. The price has recently undergone many fluctuations, in consequence of the great exports to Europe.

"The employment of this kind of manure is very ancient in Peru; and there is authentic evidence of its having been used in the time of the Incas. The white guano was then chiefly found on the islands opposite to Chinchá; so that for upwards of six hundred years the deposit has been progressively removed from those islands without any apparent decrease of the accumulation. The uniformity of climate on a coast where there is not much rain must contribute to render the Peruvian guano a more arid manure than the African, as fewer of the saline particles of the former being in solution, they are consequently less subject to evaporation."—*Tschudi's Travels in Peru*.

Remarks on the Introduction of Exotic Insects into Collections professedly British.—I had no desire to reply to the remarks of my friend Mr. Stephens, published in the February number (Zool. 1615) respecting certain species of Lepidoptera introduced into Catalogues of British Insects, the indigenous origin of which is questioned by many entomologists; but having received letters from several friends expressing a wish that I should do so, I will pen a few remarks upon the subject. I believe, with Mr. Stephens, that there is a "growing disposition" to strike out of our lists the number of foreign and imaginary species with which they have so long been encumbered, and I am willing to bear all the blame of having been one of the first to endeavour to arrive at the truth; and having no published opinions to defend, I think I can take an unprejudiced view of the subject. I cannot believe that any entomologists have wished to strike out species from our indigenous list, solely from the hope of more speedily completing a collection, by diminishing the number of desiderata; I am more inclined to suppose that there is an increased desire to examine for themselves, and not blindly to follow their predecessors without once inquiring whether they were right or wrong.

Fully aware of the irregular appearance of many insects, I must still doubt the British origin of some species contained in the older cabinets. I will take Mr. Plaster's as an example. This collection contained *Colias Philodice*, a well-known North American insect, which has never been captured in Britain or any part of Europe; *Hipparchia Hero* and *Arcanius*, said to have been taken in Ashdown Forest;

Agrotis Monostigma, (Curt.), apparently a tropical species; *Acontia Caloris*, a native of the South of Italy, *Acontia Catæna*, (Curt.), in all probability not even an European insect; *Psodos Equestraria* from Ashdown forest!—than which a more improbable locality could scarcely have been fixed upon—the insects inhabiting the Alps, and the larvæ, according to the Swiss entomologists, feeding upon *Azaleas* and *Rhododendrons*. It is very singular that so many species should have come into the possession of one collector, not one of which has ever been met with in Britain by any other person; and I must express my firm belief that every one of them is foreign. I will now make a few remarks upon species contained in other cabinets.

Agrotis subgothica. Haworth's insect is evidently simply a variety of either *Agrotis tritici* or *aquilina*. The species described and figured in the 'Illustrations,' page 126, plate 22, figure 3, is American. I have traced all the specimens which I have seen of this species in collections of British Lepidoptera to one source, and I believe the gentleman who distributed them, inadvertently mixed a number of North American insects with his British ones. I received from him as *British* a *Bombyx* which my brother took in Florida; and Mr. Benjamin Standish possesses two *Bombyces*, one of them a *Cerura*, the other perhaps a *Notodonta*, from the same entomologist, which were sent to him as British, whereas both are well-known North American insects.

Xylophasia hirticornis, Steph., page 177. This species was in the cabinet of the late Mr. Hatchett, now in the possession of my friend, Mr. Thomas Ingall; it is a native of Florida, where it was captured by my brother.

Hadena amica ? Steph., page 180. The specimens of this species contained in the old cabinets were most probably American; it is one of the commonest of the *Noctuæ* in the United States. Having a high northern range, it may be common to both continents, and the *Luperina Arctica* of Boisduval is closely allied, if not identical. *L. amica* is a very different insect.

Erastria minuta, Steph., page 118. This is not the *minuta* of Hubner, but a common North American species, which has never been found in Europe; it, however, existed in several of the old collections.

Ophiusa crassiuscula. This is another American insect. The specimen alluded to as having been taken in the north of England was obtained by Mr. Weaver from some person who knew nothing of its history, and Mr. Weaver assured me that he never stated it to be a British specimen.

Catephia leucomelas, Steph., page 128. The specimen alluded to as having been in Francillon's cabinet is a North American insect, and bears but a very slight resemblance to the true *leucomelas*, (Linn.) The description of Mr. Stephens appears, however, to apply to the European species, and not to the specimen formerly in Francillon's cabinet, and now in that of Mr. Bentley.

Lozotænia biustulana, Steph. A native of North America.

Lozotænia Schreberiana, Steph. This species bears no resemblance to the *Tortrix Schreberiana*, (Linn.), except in having a white costal spot: it is *Sericoris trileucana*, (Gm.), a common American species.

Crambus tentaculellus, Steph. The specimen in Mr. Bentley's cabinet, the only one known in Britain, appears to be the American *Crambus intervibrellus*; at any rate it is not *tentaculellus*, which is a very large species, totally dissimilar to Mr. Bentley's insect.

I could extend this list much further, but the above will suffice to show that great

doubt *does* attach to the indigenous origin of many species contained in the older cabinets; some were probably introduced by mistake, others as representatives of rare British species, and others imposed upon entomologists by unprincipled dealers.

I have not alluded to those insects which have certainly occurred in Britain in a living state, but which were undoubtedly introduced either in the egg, larva, or pupa. To this class belong *Sphinx Carolina*, *quinquemaculatus*, &c. The admission of these into our catalogues must always remain mere matter of opinion.

Papiliones. In Wood's Index, eighty-two species are given as British: of these, sixty-five are undoubtedly so; of the remaining seventeen, ten are mere varieties of other species, and seven doubtful natives. The names of five continental species are erroneously applied to varieties of British ones.

Sphingides. Thirty-six species are enumerated, of which three are doubtful.

Bombyces. One hundred and nine species are given as British: of these fifteen appear to be mere varieties, and five or six to be doubtful natives.

Noctuæ. Three hundred and thirty-nine species are enumerated: about sixty of these are mere varieties, and from twenty to twenty-five probably foreigners; about thirty names of genuine continental species are erroneously applied.

Geometræ. Three hundred and one species are figured; of which, fifty or more are either varieties or doubtful natives.

Tortrices. Three hundred and twenty species are given as British: of these, upwards of a hundred are mere varieties, and five or six are not British.

I think I have now proved that a necessity really did exist for examining our catalogues; and I now take leave of the subject, hoping one day to see a Catalogue of British Insects a little more correct than any yet published.—*Henry Doubleday*; *Epping*, April 6th, 1847.

Reasons for Expunging Melitæa Dia and Erebia Melampus from a Catalogue of British Lepidoptera.—As Mr. Weaver has found fault (*Zool.* 1657) with us for “expunging” *Melitæa Dia* and *Erebia Melampus* from our Catalogue of British Lepidoptera, I think it necessary to explain briefly why the catalogue was originally printed, and also our motives for leaving out the butterflies in question. The first edition was printed by private subscription, not with the view of being sent into the world as an authority, either as to the value of species or as to nomenclature, but simply as a matter of convenience to the subscribers. Its extreme usefulness, for the purpose of transmitting marked lists of desiderata, duplicates, &c., through the medium of the post-office, soon became apparent, and as such a number of copies only had been printed as would supply the original subscribers, we were requested to issue a second edition, which we did; this time at our own risk. Although, as I have before stated, the catalogue was never meant to be considered any authority, we wished to make this edition as perfect as possible; and being at the time in correspondence with Mr. Doubleday, I marked all the names in the first-published list that I thought doubtful, and requested his opinion as to which should go out; he kindly gave his opinion, and *Dia*, *Melampus*, &c. were accordingly “expunged.” I may mention that previously Mr. Doubleday had frequently communicated to me errors of nomenclature, &c., that he had detected, but of course to have made use of information so kindly given, when I knew him at the same time to be preparing a catalogue, would have been unhandsome in the extreme; consequently the names in common use were left undisturbed. As to the *Loch Rannoch* butterfly, there is now no doubt it is not the *Melampus* of Boisduval, and, as it is thought to be only a local variety of *Cassiope*, it

certainly cannot be admitted into the British list until Mr. Weaver, or some one, satisfactorily proves it to be distinct by breeding. Of *Dia*, I have understood the box, in which one at least of Mr. Weaver's two specimens was found, had been for some time out of his possession, and as he had believed it to contain only *M. Euphrosyne*, a larger species and very distinct, there seems to be some doubt whether *Dia* was actually his own capture, or had been introduced amongst his specimens by some one else without his knowledge. Among other names which do not appear in the second edition, I have myself proved *Lophoderus subfascianus* to be only the extreme variety of *ministranus*, both by finding the two *in copula*, and by taking, last summer, a series exhibiting every intermediate variety, which series is now in the possession of Mr. Doubleday.—*J. R. Hawley; Hall Gate, Doncaster, March 20th, 1847.*

Remarks on the New Species of Lasiocampa.—In the March number of the 'Zoologist' (Zool. 1655) there are some observations from Mr. Weaver, endeavouring to prove a new species of *Lasiocampa*: this has called to my mind the circumstance of my capturing several larvæ of *L. Quercus* near the fens of Huntingdonshire, twelve years ago. I then observed a difference among the larvæ; on my return to town, I happened to see Mr. Benjamin Standish, and related the circumstance to him: he stated that he had taken some of them at the same spot two years previously, and was certain they were another species, as they differed not only in the larva, but also in the cocoon and perfect insect, and that he communicated the circumstance to some of the leading entomologists of the day, but they paid little attention to his communication. A few days after this, my specimens formed their cocoons, which differed in colour from those of the common species: in about fourteen days they made their appearance in the perfect state, the females of a much darker colour than those of the common species; but the difference is more particularly discernible in the male, which has a white spot on the shoulder, with the dark border of the under wing broken by some yellow dashes passing through it, which I never observed in the common species: there being no 'Zoologist' at that time in which to record our observations, they were forgotten, until Mr. Weaver awakened them again in my memory. However, the colour of insects is little to be depended on in the discrimination of species, since some of the most common insects in the North are of a most beautiful deep and dark colour, totally different from that of the same species taken near London, even so different as to be supposed new species: this deep colour is given them by the quantity of iron in the soil, which is taken up by the vegetation on which they feed. But this could have had no effect on the larvæ which I captured in Huntingdonshire, as I found both species in one locality. I will now mention another circumstance which I think tends further to prove the new species distinct. In July, of the same year, I bred a female, and on the next day going to Coomb wood, I took this female with me for the purpose of attracting some males, a practice well known to some entomologists; but although I had the time of day, the weather, and the situation, all favourable to my purpose, not one male came to visit his lady-love. This circumstance I did not then understand, knowing I was on the spot where this species abounds: when about leaving the wood, a male came flying about me, which I captured. "Oh!" I exclaimed, "one at last!" But what was my surprise to find it one of the new species. I then examined my female, and found that in my hurry, I had one of the new instead of the common species, of which I had been breeding several the week before. Mr. Weaver states that they remain in the chrysalis state through the winter; I have several of the common species now in that state; and he

also states that they came out of the egg in July, and that he captured the larvæ and the perfect insect in the same month: this may be the fact, as I have taken the common species in all its states at one time. I merely mention the circumstance in order to show that there is no rule to be absolutely depended on in the definition of a species so variable in its changes. — *H. J. Harding*; 1, *York Street, Church Street, Shore-ditch, April 10th, 1847.*

[May I inquire whether both my correspondents are writing of the same insect? If so, whether it is not the *Lasiocampa roboris* of entomologists? And finally, whether Mr. Marshall and other competent observers have not bred the two varieties from the eggs of the same female parent?—*E. Newman*].

Description of British Bees belonging to the Genus Andrena of Fabricius. By *FREDERICK SMITH, Esq.*

(Continued from page 1670).

SP. 9. *ANDRENA FULVAGO*, *St. Fargeau*.
Apis fulvago, *Christi*. *Melitta fulvago*, *Kirby*.

Female.—(Length $4\frac{1}{2}$ lines). Black; the antennæ nigro-piceous beneath; the clypeus coarsely punctate; the face has a fulvous pubescence as well as the thorax, sparing on the disk; the tegulæ piceous; the wings subhyaline, slightly clouded at their margins; the legs dark rufo-piceous; the posterior tibiæ and all the tarsi rufous, clothed with a fulvous pubescence, the floccus pale fulvous, the scopa fulvous. Abdomen subovate, shining, and punctate, the apical fimbria fulvous; beneath, the apical segments have a marginal cilia of fulvous hair.

Male.—(Length 4 lines). Black; the head and thorax have a dark fulvous pubescence; the antennæ nigro-piceous beneath; the wings as in the female; the posterior tibiæ, and the intermediate and posterior tarsi ferruginous. Abdomen oblong-ovate, punctured; the three apical segments have a slight fringe of pale fulvous hair on their margins, both above and beneath.

This species appears in June, it is local but not rare; Mr. Kirby did not know the male. Hampstead, Darent, Weybridge, Hawley, Hants.

SP. 10. *ANDRENA FULVESCENS*.
Melitta fulvescens, *Kirby, MSS.*

Female.—(Length 5 lines). Black; the antennæ nigro-piceous; the mandibles ferruginous at the tips; the face clothed with fulvous

pubescence, the clypeus thinly so. Thorax fulvo-pubescent, thinly so on the disk; the tegulæ rufo-piceous; the wings hyaline; the nervures testaceous; the floccus, scopa, and all the pubescence on the legs is fulvous; the claws ferruginous. Abdomen ovate; the anal fimbria bright fulvous; beneath, the segments are fringed with hair of the same colour.

Male.—(Length $4\frac{1}{2}$ —5 lines). Black; the pubescence is of a brownish-yellow; the clypeus pale yellow, with two minute black spots, clothed with a white pubescence, as well as the mandibles and cheeks. Thorax, the tegulæ and wings as in the female; the coxæ and femora beneath have a white pubescence. Abdomen, the five apical segments have a thin brownish-yellow pubescence, and the apical segment beneath fulvous.

This species is very local near London, Hampstead Heath being the only locality I know of; in Hampshire it is not uncommon, I have there met with it in utter profusion; it appears about the beginning of June. The males soon change colour, the pubescence becoming entirely gray.

Sp. 11. *ANDRENA POLITA*, *Smith*.

Female.—(Length $5\frac{1}{2}$ lines). Black; the face thinly clothed with fulvous hair; the antennæ rufo-piceous beneath. Thorax clothed with fulvous above, rather paler on the sides and beneath; the tegulæ ferruginous; the wings subhyaline, their apical margins clouded; the pubescence on the legs, the floccus and scopa fulvous; the apical joints of the tarsi ferruginous. Abdomen shining, oblong-ovate, rather depressed, punctate, the margins of the segments, except that of the basal, piceous; the second and third segments have a narrow lateral fringe, the fourth a continuous one of fulvous hair, the anal fimbria bright fulvous; beneath, the segments laterally are fringed with fulvous hair.

Male.—(Length 5 lines). Black, resembling the female; its pubescence more inclining to ochre; the pubescence on the clypeus white, as it is also on the cheeks; on the coxæ and femora beneath it is very pale yellow; the wings are subfuscous, clouded at their margins; the apical joints of the tarsi ferruginous. Abdomen oblong-ovate, punctate, the margins of the segments slightly piceous; the apex clothed with a pale yellow pubescence.

This species I have only once met with, at Gravesend in the chalk-

pits. Mr. Desvignes has a specimen or two of the female; it appears in July, and is I expect a very local insect.

Sp. 12. *ANDRENA ALBICANS*, St. Fargeau.

Apis albicans, Mull. *Melitta albicans*, Kirby. *Apis hæmorrhoidalis*, Christi.

Female.—(Length 5 lines). Black; the face clothed with white hair, thinly so on the clypeus. Thorax clothed above with ferruginous, the sides and beneath with a pallid pubescence; the tegulæ rufous; the wings hyaline, their apical margins slightly clouded; the posterior tibiæ and tarsi fulvous, the claws ferruginous, the floccus pallid; the scopa pale fulvous. Abdomen ovate, punctate, shining, the extreme lateral margins have a thin white pubescence, the second, third, and fourth segments have a transverse slight elevation; the anal fimbria ferruginous.

Male.—(Length 4—4½ lines). Black, the pubescence fulvous; the antennæ nearly as long as the head and thorax; the tegulæ rufous; the wings as in the female; all the tarsi and the posterior tibiæ fulvous, the latter with a black stain beneath; the abdomen punctate, the margins of the segments beneath piceous.

This species appears in April, and is one of the most abundant of the genus, and found everywhere.

Sp. 13. *ANDRENA ATRA*.

Andrena pilipes, Fab.—St. Fargeau. *Apis atra*, Schrank. *Melitta pilipes*, Kirby. *Andrena aterrima*, Panzer.

Female.—(Length 6—7½ lines). Black; the face clothed with black pubescence; the clypeus naked and roughly punctured; the antennæ nigro-piceous beneath. Thorax coarsely punctured; the tegulæ nigro-piceous; the wings subfuscous, with a dark cloud on their apical margins; the floccus is of a sooty black; the scopa white. Abdomen oblong-ovate, punctate, shining; the anal fimbria sooty black.

Male.—(Length 5—6 lines). Black; closely resembling the female; the pubescence on the thorax, however, inclines to griseous; a few hairs of that colour on the basal segment of the abdomen, which is ovate-lanceolate, shining and punctate; the pubescence on the legs black; the claws ferruginous. Kirby's *M. pratensis* is a variety of this male.

This species varies in respect to the colouring of the wings, which are sometimes only slightly coloured, although generally dark, as described: it is a local species, but I have taken it plentifully in June, near Darenth Wood, Kent. I have not met with it in any other county. I found it burrowing in a perpendicular sand-bank: they are very partial to thistle-heads, from which they collect pollen.

Sp. 14. *ANDRENA CINERARIA*, *Fab.*—*St. Fargeau*.

Apis cineraria, Linn. *Apis atra*, Scop. *Melitta cineraria*, Kirby.

Female.—(Length 5—7 lines). Black; the face clothed with white pubescence; the pubescence on the thorax is white, with a broad black band between the wings, which are hyaline, having a dark cloud at their margins; the anterior femora have a fringe of long white hair beneath; the tarsi are fuscous beneath; the claws ferruginous; the floccus sooty black; the scopa black. Abdomen blue-black, smooth and shining; the anal fimbria nigrescent.

Male.—(Length 5—6 lines). Black; the face clothed with white pubescence; the antennæ nearly as long as the head and thorax, the latter clothed with white hair, slightly stained on the disk; the wings hyaline, slightly clouded at their margins; all the femora have a fringe of white hair beneath. Abdomen blue-black, lanceolate; the two basal segments thinly clothed with white pubescence.

This pretty bee appears in May; it is very abundant about London, particularly in Hyde Park, where it constructs its burrows in the hard trodden pathways.

Sp. 15. *ANDRENA THORACICA*, *Fab.*—*St. Fargeau*.

Apis thoracica, Linn. *Melitta thoracica*, Kirby. *Andrena bicolor*, *Fab., male*.

Female.—(Length 6—7½ lines). Black; the antennæ slightly nigro-piceous beneath. Thorax clothed above with rufo-ferruginous hair; the wings fuscous, with a dark marginal cloud; the legs entirely black; the tarsi beneath slightly fuscous; the claws ferruginous. Abdomen oblong-ovate, shining, very delicately punctate; the anal fimbria nigrescent; beneath, the apical segments have a fringe of sooty black hair.

Male.—(Length 5½—6 lines). Black; the pubescence on the face black; the antennæ nigro-piceous beneath. Thorax as in the female, not quite so brightly coloured; the wings subfuscous, with a slight marginal cloud. Abdomen oblong-ovate, shining.

Mr. Kirby's *Melitta melanocephala* is a variety of the male of this species. This bee appears in June, or the latter part of May in some seasons: it is a local insect; I have taken it in plenty in the sand-pits at Charlton Kent; also at Hawley, Hampshire. It burrows in sand-banks, and is very fond of collecting its pollen from thistle-heads: the female differs in the colouring of the wings, being sometimes very slightly coloured, and the marginal cloud almost obsolete.

Sp. 16. *ANDRENA NITIDA*, *Fab.*—*St. Fargeau*.

Apis nitida, Fourcroy. *Melitta nitida*, Kirby.

Female.—(Length $5\frac{1}{2}$ — $6\frac{1}{2}$ lines). Black; the pubescence on the face fuscous; the antennæ nigro-piceous beneath. Thorax clothed above with fulvous hair; the wings subhyaline, a cloud on their margins; the femora beneath have a fringe of white hair; the pubescence on the tibiæ and tarsi is fuscous; the floccus white; the scopa black above, beneath nearly white. Abdomen sub-ovate, shining, the three anterior segments have a patch of white hair at their lateral margins; the anal fimbria is of a brown-black; beneath, the margins of the segments have a long fringe of whitish hair.

Male.—(Length 5—6 lines). Black; the face clothed with pale fulvous hair, inclining to white on the clypeus; the apical joints of the antennæ slightly piceous beneath. Thorax fulvous above, and the femora beneath fringed with white hair. Abdomen ovate-lanceolate, with a thin scattered pale pubescence; the extreme apex with a few short fulvous hairs.

This species is very generally distributed; it appears in April, and is particularly fond of the flowers of the common dandelion, in which they completely cover themselves with pollen. St. Fargeau considered Mr. Kirby's *Melitta pratensis* to be a variety of the male of this species, but in this he is mistaken, the face of *M. pratensis* being clothed with black hair; it is, as I have shown, a variety of the male of *A. atra*.

Sp. 17. *ANDRENA CONSIMILIS*, *Smith*.

Female.—(Length 7 lines). Black; the face clothed with a white pubescence, becoming fuscous at the base of the antennæ, which are nigro-piceous. Thorax clothed with fulvous pubescence above, that on the femora beneath is white; all the femora and the anterior

and intermediate tibiæ nigro-piceous; the posterior tibiæ and all the tarsi ferruginous; the floccus white, and the scopa pale fulvous. Abdomen sub-ovate, shining; the three basal segments have a lateral patch of white hairs; the anal fimbria fulvous.

In general habit, there is a remarkable resemblance between this and the preceding species, and had I only seen a single specimen, I might have considered it an extreme variety, but the colour of the legs differs too much for me to consider it such. I do not know the male; in Mr. Desvignes's possession there are two specimens, and I have seen one or two more. I captured my own specimen some years ago at Coomb Wood, Surrey; some of those enumerated I believe came from the same locality.

Sp. 18. *ANDRENA VITREA*, *Smith*.

Female.—(Length $6\frac{1}{2}$ lines). Black; the face clothed with black pubescence; the cheeks and the vertex with brown-black. Thorax thinly clothed with a pale rufous pubescence; the tegulæ dark piceous; the wings hyaline, very slightly clouded at their apical margins; the nervures testaceous; the femora are fringed with pale rufous pubescence; the floccus is of the same colour; the scopa is fulvous, brightest beneath; the basal joint of the tarsi is dark ferruginous beneath. Abdomen very smooth and shining; the margin of the basal segment is rufo-piceous; the apical fimbria is black; beneath, the second segment has a rufous spot, in some individuals the whole segment is laterally more or less rufous; the margins of the apical segments have a rufous fringe.

This species is rare; Mr. Desvignes has some fine specimens in his cabinet; their locality is not known: the male has not been discovered.

Sp. 19. *ANDRENA TIBIALIS*.

Melitta tibialis, Kirby.

Female.—(Length $6-7\frac{1}{2}$ lines). Black; the face clothed with pale pubescence nearly white, a little reddish-brown hair at the base of the antennæ. Thorax clothed with a rufo-fulvous pubescence; the tegulæ piceous; the wings subtestaceous, with their apical margins clouded; the femora have a white pubescence, which is also the colour of the floccus; the posterior tibiæ and the intermediate and posterior tarsi rufo-fulvous; the scopa bright fulvous. Abdomen sub-

ovate, having a thin short pale pubescence, and also a fascia of the same colour on the margins of the segments; the anal fimbria dark brown.

Male.—(Length 5—6½ lines). Black; the face clothed with a brown-black pubescence; the antennæ nearly as long as the head and thorax, the joints sub-arcuate. Thorax above has a rufo-fulvous pubescence; the wings subhyaline, slightly clouded at their margins; the apical joints of the anterior and intermediate tarsi rufous, and the apex of the posterior tibiæ and the tarsi rufous. Abdomen lanceolate, with a thin pale rufous pubescence.

Var.—The posterior tibiæ almost or entirely rufous.

The sexes of this species I have taken *in copula*. Mr. Kirby's *Melitta atriceps* is the male. This bee is one of the most abundant of the genus; I have taken it as early as the end of March.

Sp. 20. ANDRENA MOUFFETELLA.

Melitta Mouffetella, Kirby.

Female.—(Length 6 lines). Black; the face has a pale fulvous pubescence, but that along the margins of the eyes and on the vertex is dark brown, on the cheeks it is nearly white. Thorax above is clothed with a fulvous pubescence, beneath it is nearly white; the tegulæ rufo-piceous; the wings hyaline, slightly clouded at their margins; the nervures testaceous; the posterior tibiæ, the intermediate and posterior tarsi, and apical joints of the anterior pair rufous; all the femora have a fringe of very pale hair, nearly white, as is also the floccus; the scopa is bright fulvous. Abdomen subovate, convex, and has a nigro-æneous tinge, thinly clothed with pale fulvous hair; the margins of the segments are piceous, and have a thin fringe of pale fulvous hair; beneath, rufo-piceous at the base.

Male.—(Length 4½—5 lines). Black; the face has a little fulvous pubescence at the base of the antennæ, but on the clypeus, and along the inner margin of the eyes it is dark brown; the antennæ as long as the head and thorax, the joints slightly arcuate. Thorax has a pale fulvous pubescence; the tegulæ rufo-piceous; the wings hyaline, their nervures testaceous; all the tarsi and the apex of the posterior tibiæ ferruginous. Abdomen oblong-ovate, with a thin pale fulvous pubescence.

This species is rare in cabinets; in the Kirbyan there are three or four. I have a single specimen of the female which I captured on Holdershot Heath, Hants: I have only seen one or two others, I think in the cabinet of Mr. Curtis.

Sp. 21. ANDRENA NIGRO-ÆNEA.

Melitta nigro-ænea, Kirby.

Female.—(Length 6—7 lines). Black; the pubescence on the face black, with a few fulvous hairs at the base of the antennæ; the cheeks clothed with fulvous; the pubescence on the thorax rufo-fulvous above; the tegulæ piceous; the wings subhyaline, their nervures testaceous; the stigma ferruginous; the apical margins of the wings slightly clouded; the femora have a fringe of fulvous hair, that on the tibiæ and tarsi is fuscous; the floccus pale fulvous; the scopa bright rufo-fulvous; all the tarsi beneath ferruginous. Abdomen ovate, nigro-æneous, thinly clothed with fulvous hair; the apical fimbria black.

Male.—(Length 5—6 lines). Black; the face clothed with dark rufous hair, black along the margin of the eyes and on the vertex; the antennæ as long as the head and thorax, the latter clothed above with fulvous hair, as are also the legs. Abdomen ovate, thinly clothed with fulvous hair, and with black at the apex.

This is one of the most abundant species of the genus, and is very generally distributed: it is one of the most interesting, in consequence of its being that upon which *Stylops* was first discovered by Mr. Kirby.

Sp. 22. ANDRENA BIMACULATA.

Melitta bimaculata, Kirby.

Male.—(Length $5\frac{1}{2}$ lines). Black; the face clothed with brown-black pubescence; the antennæ as long as the head and thorax, the joints arcuate. Thorax clothed above with ferruginous pubescence, which is rather paler beneath and on the legs; the tegulæ nigro-piceous; the wings subhyaline, their nervures testaceous, the apical margins slightly clouded. Abdomen ovate-lanceolate, the margins of the segments piceous, thinly clothed with pale ferruginous hair; beneath, the second segment has two lateral rufous spots.

I consider this species quite distinct from Mr. Kirby's "*Melitta atriceps*;" independent of the rufous spots, it has entirely black legs, whilst in "*atriceps*," or the male of "*tibialis*," the posterior tibiæ are pale at their apex. I have not seen this insect in any cabinet except the Kirbyan; nor do I know its female.

Sp. 23. ANDRENA TRIMMERANA.

Melitta Trimmerana, Kirby.

Female.—(Length 7 lines). Black; the pubescence on the face is of a brown-black; the antennæ as long as the head and half the thorax. Thorax clothed above with a rufo-fulvous pubescence; the tegulæ piceous; the wings hyaline, their nervures testaceous, their apex slightly clouded; the legs have a fuscous pubescence above; the tarsi ferruginous beneath; the floccus very pale ochraceous, nearly white, as is also the scopa beneath, above it is brown-black. Abdomen ovate, and clothed with a fuscous pubescence; the anal fimbria black.

Var.—The scopa is sometimes pale brown above.

Male.—(Length 5—6 lines). Black; the head a little wider than the thorax; the antennæ as long as the head and thorax, the joints arcuate; the mandibles have a minute tooth at their base, their tips ferruginous; the face clothed with pale rufous pubescence, as well as the thorax and legs; the wings hyaline, their apical margins slightly clouded; the apical joints of the tarsi ferruginous. Abdomen has a patch of long hairs at the base of the second segment in the centre; the apical segment is clothed with ferruginous hair.

This species appears to be rather local; it is, however, extremely abundant on Hampstead Heath, where it is very subject to being stylopised; I took a number thus infested, and reared the perfect Stylops from them: the antennæ of the females are longer than in any species with which I am acquainted.

Sp. 24. ANDRENA LONGIPES, *Shuckard*.

Female.—(Length 5—6 lines). Black; the face thinly clothed with pale fulvous pubescence, a thickish tuft of the same above the base of the antennæ, which are piceous beneath; the scape entirely black, nearly as long as the head and thorax. Thorax clothed above with fulvous pubescence, rather paler on the sides and beneath; the tegulæ and nervures testaceous; the wings subfuscous, slightly clouded at their apical margins; the legs have a thin fulvous pubescence; the floccus very pale, nearly white; the scopa fulvous; the posterior tibiæ and all the tarsi ferruginous. Abdomen oblong-ovate, convex, the margins of the segments narrowly piceous, and having, except the basal one, a narrow fascia of pale fulvous pubes-

cence; the anal fimbria fulvous; beneath, the margins of the segments are piceous, and are thinly ciliated with pale fulvous hair.

Male.—(Length 4—6 lines). Black; the head larger than the thorax, sometimes twice as large; the face clothed with pale fulvous pubescence; the antennæ as long as the head and thorax, the joints subarcuate; the mandibles long, curved, and subdentate at their base. Thorax has a thin pale fulvous pubescence; the wings as in the female; all the tarsi ferruginous. Abdomen lanceolate, naked; the tip ferruginous.

This fine species was, I believe, first discovered by Mr. Shuckard, on Hampstead Heath, where it is not uncommon in April and May. I have also taken it on Hawley Flat, Hants. Some specimens of the male have enormous large heads, which, with their long curved mandibles, give them a very ferocious aspect. Mr. Desvignes has the finest series of the varieties of this species which I have seen.

Sp. 25. *ANDRENA VARIANS*.

Melitta varians, Kirby.

Female.—(Length 5—5½ lines). Black; on the face below the base of the antennæ is a little brown-black pubescence, at their base it is black; the antennæ are nigro-piceous beneath. Thorax, above clothed with fulvous pubescence; the tegulæ ferruginous; the wings subhyaline, the nervures testaceous, the apical margins slightly clouded; the legs have a fuscous pubescence above, but on the femora beneath it is paler; the tarsi beneath are dark ferruginous; the floccus white; the scopa beneath is shining silvery-white, above it is brown-black. Abdomen ovate, the pubescence on the first and base of the second segment is fulvous, on the rest it is thinner and black.

Male.—(Length 4—5 lines). Black; the head wider than the thorax; the face below the base of the antennæ is clothed with long silvery pubescence, at their base it is ochraceous; the antennæ nearly as long as the head and thorax; the mandibles are subdentate at their base, ferruginous at their tips. Thorax, above thinly clothed with rufo-fulvous pubescence, at the sides and beneath it is paler; the tegulæ piceous; the wings iridescent, the nervures testaceous; the legs have pale fulvous pubescence. Abdomen ovate-lanceolate, at the base is a patch of pale fulvous hair, the apex is fulvous; beneath, the margins of the segments are ciliated with white hair.

The insect which I have considered to be the male of this species I think is identical with the subdentata of Kirby. I consider it to be

the male finding them so constantly in company: the species is common in April and May, particularly on Hampstead Heath. The male in the Kirbyan collection is much mutilated: I think it is much too large an insect to belong to *varians*: I have so frequently observed the sexes described sporting together, that I have little doubt they are correctly paired.

Sp. 26. *ANDRENA HELVOLA*, Fab.

Apis helvola, Linn. *Melitta helvola*, Kirby.

Female.—(Length 5—5½ lines). Black; the face clothed with a pale yellow pubescence; the antennæ nigro-piceous beneath. Thorax clothed above with rufo-fulvous pubescence; the tegulæ ferruginous; the wings hyaline, their apical margins slightly clouded, the nervures testaceous; the legs have a rufo-fulvous pubescence; the femora beneath are fringed with white hair; the floccus white; the scopa pale fulvous, palest beneath; the apical joints of the anterior tarsi, and the whole of the intermediate and posterior pairs, ferruginous. Abdomen oblong-ovate, clothed with a grayish pubescence, having a patch of fulvous hair at the base.

Male.—(Length 4½—5 lines). Black; the head rather wider than the thorax; the clypeus clothed with long white hair, tinged with yellow at the base of the antennæ. Thorax clothed above with rufo-fulvous; the wings hyaline, iridescent, slightly clouded at their apical margins; the apical joints of the tarsi ferruginous. Abdomen ovate-lanceolate, and has a patch of fulvous hair at the base, sometimes obsolete; beneath, the margins of the segments are ciliated with white hair.

This species is not so abundant as the preceding, but is by no means uncommon. The female varies in the colour of its pubescence, being very liable to fade from exposure, that on the abdomen being in very recent individuals pale fulvous. The male which I have described seems to be identical with Mr. Kirby's *angulosa*; that in the Kirbyan collection is almost entirely mutilated, but I do not think it is identical with mine, it being much larger. I cannot think Mr. Kirby's male correctly united, but the males of this genus vary very much both in size and colouring.

Sp. 27. *ANDRENA GWYNANA*.

Melitta Gwynana, Kirby.

Female.—(Length 5—5½ lines). Black; the face clothed with

black hair ; the mandibles ferruginous at their tips. Thorax clothed above with ferruginous pubescence ; the tegulæ piceous ; the wings subhyaline, their apical margins slightly clouded, the nervures ferruginous ; the floccus pale ferruginous ; the scopa ferruginous. Abdomen subovate, the three basal segments are thinly clothed with ferruginous pubescence ; the anal fimbria black.

Male.—(Length 4—4½ lines). Black ; the face clothed with long black pubescence ; the antennæ nearly as long as the head and thorax, the joints subarcuate. Thorax clothed above with dull pale ferruginous, with which the legs are also fringed beneath ; the tegulæ dark piceous ; the wings subhyaline, iridescent, their apical margins slightly clouded. Abdomen ovate-lanceolate, with thinly scattered rufescent pubescence.

This is a very abundant species during April and May, and appears to be dispersed all over the country.

Sp. 28. *ANDRENA PROXIMA*, *Smith*.

Female.—(Length 4 lines). Black ; the face clothed with a black pubescence ; the antennæ nigro-piceous beneath. Thorax clothed above with ferruginous pubescence ; the tegulæ dark piceous ; the wings subhyaline, their apical margins slightly clouded ; the pubescence on the legs ferruginous ; the posterior tibiæ and tarsi dark ferruginous ; the floccus pale yellow ; the scopa of a golden yellow. Abdomen ovate, the margins very thinly fringed with yellow pubescence ; the anal fimbria black.

I do not know the male of this species. The female appears in June : I have taken it at Weybridge and in Hants. I have observed it in some collections mixed with the preceding species, which it resembles.

Sp. 29. *ANDRENA FUCATA*, *Smith*.

Female.—(Length 5—6 lines). Black ; the face has a thin pale fulvous pubescence, and a line of short decumbent silvery pile along the inner margin of the eyes ; the antennæ nigro-piceous beneath ; the apical margin of the clypeus emarginate and laterally produced, forming acute teeth. Thorax, on the disk clothed with a thin pale fulvous pubescence, and on the metathorax with white ; the tegulæ rufo-piceous ; the wings subhyaline ; the posterior tibiæ and tarsi dark ferruginous ; the floccus silvery-white, as is also the scopa, ap-

pearing in different lights of different colours, more or less tinged with fulvous ; the tarsi beneath ferruginous.

Male.—(Length 4—5 lines). Black ; the face clothed with white pubescence ; the antennæ as long as the head and thorax, the joints slightly arcuate. Thorax thinly clothed with pale fulvous pubescence beneath, and on the femora it is white ; the tegulæ piceous ; the wings hyaline, iridescent, slightly clouded at the margins, their nervures testaceous ; the posterior tibiæ, and the intermediate and posterior tarsi, pale rufous, usually a dark stain on the posterior tibiæ at the base beneath. Abdomen ovate-lanceolate ; the apex fulvous.

This species I have received from Bristol, also from Scotland : the male described I received with the specimens from Scotland. I also found the same male arranged with this species in the collection of Mr. Shuckard, now in the possession of Mr. Desvignes.

Sp. 30. *ANDRENA DISTINCTA*, *Smith*.

Female.—(Length 6 lines). Black ; the face thinly clothed with fulvous pubescence ; the antennæ as long as the head and thorax, the latter thinly clothed with fulvous ; the tegulæ rufo-piceous ; the wings subfuscous, slightly clouded at their apical margins, the nervures testaceous ; the legs rufo-piceous ; the posterior tibiæ and all the tarsi ferruginous ; the floccus very pale fulvous ; the scopa bright fulvous. Abdomen sub-ovate, the margins of the segments slightly piceous ; the apical fimbria ferruginous.

This species is rare in cabinets ; I possess but a single specimen ; there are two or three in Mr. Desvignes's collection : I cannot learn their locality. I do not know the male.

Sp. 31. *ANDRENA CONJUNCTA*, *Smith*.

Female.—(Length 6 lines). Black ; the face has a thin dark fulvous pubescence ; the antennæ piceous beneath. Thorax very thinly clothed with fulvous pubescence on the disk, becoming paler on the sides and metathorax ; the wings hyaline, slightly clouded at their apical margins ; the posterior tibiæ and tarsi dark ferruginous ; the floccus pale fulvous ; the scopa bright fulvous beneath, above less bright and shining ; the tarsi bright fulvous beneath. Abdomen ovate, convex, and punctate ; the margins of the segments laterally are slightly fringed with a few pale fulvous hairs ; the anal fimbria black.

This is a distinct species; I captured it some years ago at Highgate, in July, since which I have not met with it.

Sp. 32. *ANDRENA ANGUSTIOR.*

Melitta angustior, Kirby.

Female.—(Length $4\frac{1}{2}$ —5 lines). Black; the face clothed with fuscous pubescence; the antennæ piceous beneath. Thorax clothed above with fulvous, but with paler pubescence on the sides and metathorax; the tegulæ piceous; wings subhyaline, the apical margins slightly clouded; the legs nigro-piceous; the posterior tibiæ and tarsi ferruginous; the floccus very pale ochraceous; the scopa pale fulvous. Abdomen, the margins of the segments are sparingly fringed with pale fulvous pubescence; the apical fimbria fuscous; beneath, the apical segments have a rather long fringe of pale fulvous pubescence.

Male.—The head as large as the thorax; the face clothed with black pubescence; the antennæ scarcely as long as the head and thorax; the legs rufo-piceous. Abdomen has a thin cinereous pubescence, beneath dark rufo-piceous.

The male described is in accordance with Mr. Kirby's description, but I think it doubtful if they are correctly paired: there is no specimen of either sex in the Kirbyan cabinet: the female is rare, being seldom found in cabinets.

Sp. 33. *ANDRENA PICICORNIS.*

Melitta picicornis, Kirby.

Female.—(Length 5 lines). Black; the face clothed with dark brown pubescence, a little paler on the cheeks; the antennæ rufo-piceous. Thorax thinly clothed with pale fulvous pubescence; the tegulæ piceous; the wings subtestaceous, the apical margins slightly clouded, the nervures piceous; the legs rufo-piceous; the floccus very pale yellow, nearly white; the scopa bright yellow. Abdomen dark rufo-piceous; the margins of the segments piceous; the apical fimbria fuscous.

The only specimens which I have seen of this species are the pair in the Kirbyan cabinet; taken by Mr. Kirby at Barham, Suffolk.

Sp. 34. ANDRENA PICIPES.

Melitta picipes, Kirby.

Male.—(Length 4 lines). Head larger than the thorax, with a griseous pubescence; the face with hoary pubescence. Thorax clothed above with fulvous; the wings hyaline, their nervures testaceous; the legs rufo-piceous, their pubescence pallid. Abdomen fuscous, shining and pilose; beneath, the segments are fringed with pallid hair.

There is no specimen of this bee in the Kirbyan cabinet; that described by Mr. Kirby was in Dr. Drury's collection: I have not met with any insect *exactly agreeing* with the description.

Sp. 35. ANDRENA FULVA, St. Fargeau.

Apis fulva, Schrank. *Apis vestita*, Panzer. *Andrena vestita*, Fab.*Apis armata*, Linn., male. *Melitta fulva* and *armata*, Kirby.

Female.—(Length $5\frac{1}{2}$ — $6\frac{1}{2}$ lines). Black; the face clothed with black pubescence. Thorax clothed above with rich ferruginous; the tegulæ ferruginous; the wings hyaline, slightly clouded at their apical margins, their nervures ferruginous; the legs clothed with black pubescence; the floccus of a sooty black. Abdomen ovate, clothed with a dense rich bright fulvous pubescence; the apical fimbria is of a palish yellow; beneath, the segments have a marginal black fringe.

Male.—(Length 5 — $6\frac{1}{2}$ lines). Black; the head as large, or sometimes much larger than the thorax; the clypeus clothed with white pubescence, becoming slightly ferruginous at the base of the antennæ, which are nigro-piceous beneath; the mandibles long, curved, and bidentate at their apex, at their base beneath is a short acute tooth. Thorax clothed above with ferruginous pubescence, as are also the legs and abdomen; on the latter it is thin, except at the margin of the basal segment, where it forms a longish fringe; the wings hyaline, iridescent, and slightly clouded at their apical margins, their nervures testaceous. Abdomen ovate-lanceolate.

I believe I was the first to discover the male of *fulva*, which I did in 1840. I took several pairs *in coitu*, which since that period I have observed on two or three occasions. This is the most beautiful species of the genus; it appears in April, and is generally distributed: on Hampstead Heath it is particularly abundant during April and

May ; but to secure fine specimens like those described, the insect must be captured as soon as they appear ; the pubescence in both sexes soon fades from exposure, the female becoming pale yellow, and the clothing of the male entirely hoary.

Sp. 36. *ANDRENA CLARKELLA*.

Melitta Clarkella, Kirby. *Andrena bicolor*, St. Fargeau.

Female.—(Length 5 — $6\frac{1}{2}$ lines). Black ; the face clothed with black pubescence. Thorax clothed above with fulvous ; the tegulæ nigro-piceous ; the wings hyaline, their apical margins slightly clouded ; the nervures ferruginous ; the pubescence on the legs black ; the four anterior tarsi dark rufo-piceous ; the posterior tibiæ and tarsi fulvous ; the floccus sooty-black ; the scopa bright fulvous. Abdomen ovate, clothed with black pubescence.

Var. 1.—The abdomen with a few fulvous hairs on the basal segment.

Var. 2.—The first and second segment clothed with rather pale fulvous hair, and on the third segment fringed with the same.

Male.—(Length $4\frac{1}{2}$ —5 lines). Black ; the face has a little fulvous pubescence on the clypeus, but at the base of the antennæ, and along the inner margins of the eyes it is black. Thorax also clothed with fulvous, paler on the sides and on the metathorax ; the tegulæ dark piceous ; the wings hyaline, iridescent, very slightly clouded at their apical margins ; the pubescence on the legs is pale fulvous ; the apex of the posterior tibiæ beneath is piceous ; all the tarsi are ferruginous beneath. Abdomen ovate-lanceolate ; the extreme apex is pale fulvous.

I have retained Mr. Kirby's name for this bee, although St. Fargeau has considered it as synonymous with the *A. bicolor* of Fabricius, but I agree with Mr. Kirby that the *A. bicolor* of Fabricius is identical with the male of *A. thoracica* : had Fabricius described the present species, he could hardly have omitted its principal characteristic, the pubescent abdomen. This bee is one of the earliest to appear in spring ; I have taken it at the end of March in a fine warm season. I discovered the male, in 1837, by digging both sexes out of a sand-bank at Bishop's Wood, Hampstead ; in 1840 I captured two pairs *in copula*, the male not being previously known. I have received the species from Scotland.

Sp. 37. ANDRENA SMITHELLA.

Melitta Smithella, Kirby.

Female.—(Length 5 — 6 lines). Black; the pubescence on the face pale fulvous; the antennæ piceous beneath. Thorax clothed above with rufo-fulvous pubescence; the tegulæ nigro-piceous; the wings hyaline, slightly clouded at their apical margins, the nervures ferruginous; the floccus bright yellow; the scopa yellow beneath, slightly fuscous above; the apical joints of the tarsi rufo-piceous; the pubescence on the legs yellow. Abdomen oblong-ovate, slightly depressed, the segments clothed, excepting the base of each, which is nearly naked, with rather long pale fulvous pubescence; the margins of the segments piceous; the apical fimbria ferruginous.

This is a rare species, which I have not had the good fortune to meet with; I have captured a species closely resembling it, but upon comparison with the specimens in the Kirbyan cabinet, not identical. The insect next described I have seen in several collections named *Smithella*, from which it differs in the clothing of the abdomen; in *Smithella*, if viewed laterally, it forms bands of long bright yellow hair, the base of each segment being naked; but in that which I shall next describe is equally distributed, not forming bands or fasciæ.

Sp. 38. ANDRENA APICATUS, *Smith*.

Female.—(Length 6 lines). Black; the face has a fuscous pubescence on the clypeus, and black along the margins of the eyes; the antennæ are nigro-piceous beneath. Thorax pale fulvous above; the tegulæ piceous; the wings subhyaline, the apical margins slightly clouded, the nervures ferruginous; the pubescence on the legs beneath is pale fulvous, above it is slightly fuscous; the scopa beneath is pale bright fulvous, above it is fuscous; the floccus is pale fulvous; the tarsi beneath are bright ferruginous. Abdomen ovate, clothed with long pale fulvous pubescence; the apical fimbria black; the margins of the segments are piceous; beneath, the margins of the segments are piceous, and fringed with long pale fulvous hair.

This species closely resembles *A. Smithella*, but is rather larger; the tip of the abdomen is black, and is of a different form, being more ovate, and more convex above: it is a rare species, only occasionally met with.

Sp. 39. ANDRENA BIDENTATA.

Melitta bidentata, Kirby.

Male.—(Length $4\frac{1}{2}$ lines). Black; the face clothed with longish yellow pubescence; the apex of the clypeus has two acute teeth placed laterally, between which the labrum projects, forming a third large obtuse tooth, which is concave beneath; the antennæ nearly as long as the head and thorax, piceous beneath. Thorax clothed above with a dense rufo-fulvous pubescence; the tegulæ piceous; the wings hyaline, their apical margins slightly clouded; the legs rufo-piceous, their pubescence pale fulvous; the tarsi testaceous. Abdomen sub-ovate, the margins of the segments rather thickly fringed with pale fulvous pubescence, the margins slightly piceous; beneath, the margins are also fringed in a similar manner; the pubescence, however, is longer and rather thinner.

There is that close resemblance between this bee and the *A. Smithella*, that I quite agree with Mr. Kirby in suspecting that it is the male of that species. I have not seen it in any cabinet except the Kirbyan; it is doubtless a very local insect. Mr. Kirby's came from Melton, in Suffolk, captured in August.

Sp. 40. ANDRENA NIGRICEPS.

Melitta nigriceps, Kirby.

Female.—(Length $5-5\frac{1}{2}$ lines). Black; the pubescence on the face black; the antennæ piceous beneath; the vertex has a fringe of fulvous hair on its margin; the disk of the thorax densely clothed with rufo-fulvous pubescence, rather paler on the sides and metathorax; the tegulæ ferruginous; the wings hyaline, slightly clouded on their apical margins, their nervures dark ferruginous; the pubescence on the legs black; the floccus sooty-black; the apical joints of the tarsi ferruginous. Abdomen ovate, sub-depressed; the four basal segments have a broad fascia of fulvous pubescence; the anal fimbria black.

This is a very rare species; there are two specimens in the Kirbyan cabinet, one in that of the British Museum, the same in Mr. Desvignes and my own. I am indebted to Mr. Dale for my specimen, who captured one or two last year. I do not know the male. Mr. Kirby has given a short description of one which he thought

might probably belong to it, but the specimen is not in the Kirbyan cabinet: it is described as having the head clothed with black hair; the antennæ short. Thorax above dark rufous; the nervures of the wings yellow. Abdomen lanceolate; the margins of the segments have a dense fringe.

Sp. 41. *ANDRENA ARTICULATA*, *Smith*.

Male.—(Length $5\frac{1}{2}$ lines). Black; the face clothed with fuscous pubescence, a little black along the margins of the eyes; the antennæ rather short, stout; the joints subarcuate, nigro-piceous, excepting the two basal joints, which are jet-black. Thorax thinly clothed above with pale fulvous, very pale at the sides and on the metathorax; the tegulæ dark piceous; the wings subfuscous, and slightly clouded at their apical margins, the nervures testaceous; the legs rufo-piceous, their pubescence fulvous; the apical joints of the tarsi ferruginous. Abdomen oblong-ovate, punctate, the margin of the basal segment sometimes rufo-piceous; all the segments have a thin pale fulvous fascia; beneath, the second segment is either rufo-piceous, or has two rufous maculæ, sometimes the rufous colouring is obsolete.

This is a very distinct species, and I suspect is a very local insect. I do not know any female to which I could imagine it might be united. Mr. Desvignes and myself have each a single specimen.

Sp. 42. *ANDRENA RUFITARSIS*.

Melitta rufitarsis, Kirby.

Female.—(Length 5 lines). Black; the face clothed with grayish-white pubescence; along the inner margin of the eyes, as high as the vertex, is a line of short pale down; the antennæ beneath rufo-fulvous, the basal joints black. Thorax clothed with dense pale yellow pubescence; the tegulæ rufo-piceous; the wings subhyaline, very slightly clouded at their margins, their nervures piceous; the legs rufo-piceous, and have a pale ochraceous pubescence; the flocus is of the same colour; the scopa inclining to fulvous; all the tarsi rufous. Abdomen oblong-ovate; the margins of the segments are narrowly piceous, and have a thick fringe of pale yellow pubescence; the anal fimbria fulvous.

This is a rare species: I have never met with it, nor have I seen it in any but the Kirbyan cabinet; it closely resembles the next species *A. fuscipes*, but its legs are of a paler colour as well as their pu-

bescence, and the anal fimbria is bright fulvous, the fascia on the abdominal segments are full one-third broader than in fuscipes, although at first sight the two species might be confounded; they are very distinct, but some species of this genus very closely resemble each other.

Sp. 43. ANDRENA FUSCIPES.

Melitta fuscipes, Kirby.

Female.—(Length 5—5½ lines). Black; the face is very thinly clothed with pale fulvous pubescence, a line of pale short down along the inner margin of the eyes, reaching to the vertex; four or five of the apical joints of the antennæ are rufo-piceous beneath; the pubescence on the thorax above is fulvous; it is very thick, but paler on the metathorax; the tegulæ testaceous; the wings subhyaline, slightly clouded at their apical margins, their nervures piceous; the floccus very pale yellow, nearly white; the scopa is pale beneath, but fuscous above; the tarsi beneath are ferruginous; the apical joints are rufo-piceous. Abdomen sub-ovate; all the margins have a fascia of very pale fulvous pubescence; the apical fimbria fuscous.

Male.—(Length 4 lines). Black; the pubescence on the face is nearly white; on the thorax it is ochraceous, very pale at the sides and beneath; the tegulæ nigro-piceous; the wings iridescent, subhyaline, and slightly clouded at their margins; the tarsi beneath have a ferruginous pubescence; the apical joints are rufo-ferruginous. Abdomen lanceolate; the margins have each a pale fascia of rather long pubescence, which also thinly clothes the basal segment, and is scattered between the fasciæ.

The male of this species is the pubescens of Kirby; the specimen in the Kirbyan cabinet is gray from age, a change to which this species is very subject, particularly the male: it is very abundant in Hampshire, frequenting heaths: I never found it in any other locality; it is also very plentiful at Weybridge, in July and August. Mr. Kirby considered the male to be the pubescens of Fabricius, but as the description of that author would equally well suit several other species, I have retained Mr. Kirby's name of the female.

Sp. 44. ANDRENA LACINIA, *Smith*.

Female.—(Length 5 lines). Black; the face thinly clothed with short pale pubescence; the antennæ slightly piceous beneath.

Thorax clothed above with fulvous pubescence, much paler on the sides, and white beneath; the tegulæ rufo-piceous; the wings subhyaline, clouded at their apical margins; the legs dark rufo-piceous; the floccus white; the scopa pale beneath, fuscous above; the apical joints of the tarsi ferruginous. Abdomen oblong-ovate; the margins of the segments piceous, clothed with a pale yellow pubescence, the margins have each a white fascia; the anal fimbria dark fuscous; beneath the abdomen rufo-piceous, and the margins of the segments have a cilia of white hair; on the fifth and sixth it is reddish-brown.

This is a very rare species; I do not know its locality: there are several specimens in Mr. Desvignes's cabinet; I am indebted to that gentleman for my specimen.

Sp. 45. ANDRENA LISTERELLA.

Melitta Listerella, Kirby.

Female.—(Length 5—5½ lines). Black; the face has a thin pale yellow pubescence; the antennæ are fulvous beneath, excepting the three basal joints. Thorax thinly clothed above with pale fulvous pubescence; the tegulæ black; the wings subhyaline, their apical margins slightly clouded; the legs dark rufo-piceous; the floccus pale fulvous; the scopa, and all the tarsi beneath bright rufo-fulvous. Abdomen oblong-ovate; the marginal fasciæ very pale, nearly white; the anal fimbria slightly fulvous; the margins of the segments beneath are thinly fringed with fulvous pubescence.

Male.—(Length 4 lines). Black; the face thinly clothed with pale ochraceous pubescence; the apex of the clypeus bidentate, there are also two curved teeth on the labrum, and also a short acute tooth at the base of the mandibles, which are long and curved. Thorax above has a thin ochraceous pubescence; the wings subhyaline, their apex clouded; all the tarsi are bright fulvous beneath; the apical joints of the tarsi rufo-testaceous. Abdomen ovate-lanceolate; the margins of all the segments except the basal one, have a narrow fascia of very pale ochraceous pubescence; one or two of the apical segments have their margins piceous; beneath, the margins have a cilia of pale fulvous hair.

This is a rare species, being I suspect extremely local; I have once or twice taken a specimen of the female, but only one of the male; I once saw several of both sexes captured in company, and from the general resemblance between them, I have no hesitation in uniting them; the male is the denticulata of Kirby. I may here

remark that many of the specimens described in the 'Monographia Apum Angliæ' are in a worn and faded condition, which will account for the difference in many of my descriptions compared with Mr. Kirby's; but I always, if possible, describe from a recent specimen; due allowance must therefore be made for age, which greatly changes the colour.

FREDERICK SMITH.

5, High Street, Newington,
May 13th, 1847.

Further Notes on the Entomology of Lundy Island.

By T. VERNON WOLLASTON, Esq., B.A., F.L.S.

IN a former volume of the 'Zoologist,' I gave a slight sketch of the Entomology of Lundy Island, the result of a five day's expedition in June, 1844, undertaken by myself for the purpose of investigating, as far as was practicable, its indigenous Coleoptera. From its peculiar position, its small extent, and the extremely barren aspect of the coast, I before stated, that, to an entomologist, nothing could possibly be more unpromising than its whole appearance. And so, in the first instance, it proved. Nevertheless, by dint of perseverance, I managed, during my stay in 1844, to number in all sixty-five species. Since that time I have had another opportunity of exploring the same locality and testing my previous observations. In July, 1845, I started from Ilfracombe on a second visit to the island, resolved to make the most of a week's excursion and ascertain more accurately the real nature of its Coleopterous Fauna. The result was far more satisfactory than on the previous occasion; the number of species this time amounting to one hundred and twenty-one, eighty-eight of which were altogether distinct from those collected in 1844. Considering the short space by which the island is separated from the coasts of Devonshire and Cornwall (the nearest point of land being less than fourteen miles distant), I before expressed my surprise at not finding the Entomological Fauna in most respects identical. Yet both occasions have proved them to be quite dissimilar.

Inasmuch as the only opportunity I have had of exploring the opposite coast of Wales was not until 1845, I was unable, after my first excursion to the island in 1844, to give any particulars as to how far

the species I then collected might be coincident with the Welch ones. Still, judging from their extraordinary want of similarity to those which I had been accustomed to observe on the north coast of Devonshire and Cornwall, and the occurrence of a few remarkable species which I knew to be common throughout the south of Wales; I was inclined to believe, that, in spite of the immense difference between the distances of the two shores, (the one being about thirty miles in a direct line, the other only fourteen), they partook more of the character of the Welch Coleoptera than of those, as we should have naturally supposed, of the nearest coast; in which conjecture I have since found that I was not mistaken. The following species, which I took at Lundy, occurred profusely at Tenby and in its immediate vicinity: *Dromius foveolus*, *Haliphus lineato-collis*, *Hydroporus nigrita* and *jugularis*, *Parnus prolefericornis*, *Laccobius minutus* and *globosus*, *Cercyon stercorarium*, *Aphodius ater*, *Rhinonchus pericarpus*, *Sitona puncticollis*, *Thyamis tabida*, *Cteniopus sulphureus*, *Aleochara fus-cipes* and *nitida*, *Philonthus lituratus*, *Xantholinus glabratus* and *linearis*. At Carmathen also many species were particularly abundant, which were in equal profusion at Lundy. I might mention, amongst others, as characteristic, *Argutor erythropus*, *Trechus minutus*, *Harpalus æneus*, *Helephorus griseus*, *Limnebius truncatellus*, *Otiorhynchus ligneus*, *Apion violaceum*, *Raphirus semiobscurus*, *Oxytelus depressus*, *Staphylinus æneocephalus*, &c. There are a few of these which I could lay more particular stress upon, because they are remarkably local, and seem to point especially to some peculiar (though in the present instance, obscure) similarity in the places which produce them.

Thus, the beautiful *Cteniopus sulphureus*, I have in vain searched for on the north coasts of Devonshire and Cornwall, though abounding with the identical kind of flowers in which they occur so profusely in Lundy Island and Wales. At Tenby they may be found on the umbelliferous plants which are scattered sparingly over the sand-hills facing the sea. In Lundy they were in the greatest profusion, and, though confined in so small an island, it was really curious even there to remark their excessive partiality to a single spot. Confining themselves to a most minute area in the south-eastern part of the island, they were contented to remain there and were never observed to roam. In the sunshine, indeed, they might be seen occasionally on the wing, but they were merely passing from flower to flower and wandered not from their prescribed sphere. It was rare, however, to find them on the wing at all, for they were usually buried deep in the

white flowers of the umbel, from which a small piece of yellow emerging through the surrounding "snow" would have alone enabled me to detect them, had I not been aware of their habits and dealt with them accordingly. The fact is, they were, in many instances, so completely gorged on their floral banquet, that, drunk with excess, they had been burying themselves deeper and deeper into the umbel, until, gradually receding from the sight, they had sunk into a vast and profound sleep entirely beneath it; so that, in walking over the flowers, very frequently not a *Cteniopus* would appear, but, on gently bending them at right angles to the stalks, a yellow host, congregated closely and comfortably together, might be observed below! Mr. Dillwyn records its occurrence also at Swansea, and observes that it is "not uncommon on umbelliferous and other plants, and is sometimes very abundant on the flowers of *Rosa spinosissima* on Sketty Burrows." Another very remarkable instance of similarity between the insects of Lundy Island and Wales, is the occurrence at Tenby of a *Macrocnema*, which I discovered at Lundy in 1844 and had considered it as a new species. I still think it distinct from anything acknowledged as indigenous to this country, but have refrained from describing it, knowing how excessively subject to variation many of the individuals of that genus are, and conceiving it possible that the proximity to the sea, or some other local cause, might have so altered and disguised one of the well-known species, as to allow of its assuming the present abnormal form. Be this, however, as it may, the same form occurred to me at Tenby, being the only locality, besides Lundy Island, which has yet come beneath my notice.

Hydroporus jugularis is another instance of a very local insect (and one which, I think, is usually considered rare) occurring profusely in the two localities. And, in like manner, I might go on to enumerate hosts of others (such as *Sarrotrium muticum*, *Orobitis cyaneus*, *Otiorynchus rugifrons*, &c.) equally abundant in Lundy Island and Wales, though searched for in vain on the north coast of Devonshire and Cornwall,—but space fails me. So far indeed as my own experience goes, the north coasts of Devonshire and Cornwall (and I have had good opportunities of exploring them) have a Fauna, as regards Coleoptera at least, most characteristic and peculiar. Unlike the southern coast of the same counties, and still more unlike the south coast of Wales, they abound in a profusion of insects of which few localities can boast. Not to mention many rarities which have occurred in few or single instances, I might record, amongst a long train of others,—*Cicindela maritima*, *Nebria complanata*, *Chlænium melanocornis*, *Pe-*

ryphus decorus and tibialis, Ceryon obsoletum, Latridius angusticollis, Cryptophagus scutellatus, Geotrupes lævis, Aphodius scrofa, Oxyomus cæsus, Selatisomus æneus, Throscus dermestoides, Cyphon Pini (*Curtis*), Cossonus Tardii, Hypera dissimilis, Sitona cambrica, Cleonus nebulosus, Apion subulatum, Sphæriestes ater, Leptura aurlenta, Chrysomela hæmoptera, Oncomera melanura, Oxytelus depressus, &c., not one of which I have myself discovered on the opposite coast, and only four of which are recorded by Mr. Dillwyn in his elaborate and copious 'Catalogue of the Coleoptera of the Neighbourhood of Swansea.'

It will thus be perceived, from the previous remarks, how great a want of similarity the Coleoptera of Lundy Island displays to the species observable on the opposite and nearest shore, and the peculiar and striking resemblance which they bear to those abundant on the more distant coast of Wales. Out of 153 species which I have myself captured within the small and barren compass of Lundy Island, I have ascertained 109 to inhabit for certain the coast of Wales; while, from the common and universally distributed nature of the remaining 44, I have reason to believe that the whole 153 would, if properly searched for, be found there in profusion. The above observations will show how far different is the state of things along the northern shores of Devonshire and Cornwall, which, although separated from the land by so narrow a space, and, although Lundy is itself a portion, both naturally and artificially, of the county of Devon, have nevertheless a Coleopterous Fauna utterly dissimilar, and, comparatively speaking, peculiar to themselves. I attempt not to account for this singular fact; but it is certainly a very remarkable one, and, inasmuch as it may bear strongly on the general question of geographical distribution, it is certainly worth recording.

Out of the 121 species, the result of my visit to the island in 1845, I subjoin a list of the 88 already referred to, as being distinct from those formerly recorded in the 'Zoologist' (Zool. 899), and captured during my first trip in 1844.

Dromius linearis
 ——— foveolus
 Carabus granulatus
 ——— nemoralis
 Badister bipustulatus
 Omaseus affinis
 Steropus madidus
 Pæcilus versicolor
 Amara plebeia

Harpalus annulicornis
 Ophonus puncticollis
 Trechus fulvus
 ——— minutus
 Notiophilus aquaticus
 Hydroporus rufifrons
 ——— erythrocephalus
 ——— planus
 Colymbetes nebulosus

Laccobius minutus
Parnus prolefericornis
Limnebius ater
 ——— *truncatellus*
Cercyon bolitophagum
 ——— *stercorarium*
Leiodes rufa ?
Necrophorus Vestigator
 ——— *Humator*
Silpha tristis
Meligethes viridescens
 ——— *Urticæ*
Cateretes Junci
 ——— *glaber*
 ——— *pyrrhopus*
Atomaria atricapilla
Corticaria crenulata
 ——— *gibbosa*
Latridius transversus
Byrrhus pilula
Aphodius Fossor
Geotrupes sylvaticus
Serica brunnea
Adrastus limbatus
Agriotes sputator
 ——— *lineatus*
Dasytes cæruleus
Nedys Erysimi
 ——— *Ericæ*
 ——— *Troglodites*
Orobitis cyaneus
Rhinonchus Pericarpium
Hypera punctata
Otiorhynchus rugifrons
 ——— *ligneus*

Tychius tomentosus
Strophosomus squamulatus
Sitona hispidula
 ——— *puncticollis*
Apion hæmatodes
 ——— *Carduorum*
 ——— *flavipes*
Rhynchites minutus
Crepidodera exoleta
Thyamis tabida
 ——— *pratensis*
Macrocnema Dulcamaræ
Apteropeda graminis
Chrysomela Hyperici
Cryptocephalus ochraceus
Coccinella reppensis
Seymnus limbatus
Cteniopus sulphureus
Proscarabæus violaceus
Aleochara lanuginosa
 ——— *nitida*
Tachyporus gracilis
 ——— *pyrrhopterus*
 ——— *merdarius*
 ——— *obtusius*
 ——— *Hypnorum*
Staphylinus æneocephalus
Goërius olens
Philonthus lituratus
Raphirus semiobscurus
 ——— *Boops*
Xantholinus glabratus
Stenus impressus (Erichson)
 ——— *Boops (Gyll.)*
Oxytelus depressus

I ought to state that I am indebted for about half a dozen of these species to the kindness of my friend, Mr. Hudson Heaven (the son of the proprietor of the island), whose valuable assistance during my stay in 1845, and whose after exertions in the cause in which I have taken so much interest, it gives me the greatest pleasure to record.

T. V. WOLLASTON.

Jesus College, Cambridge.

Animals of the Puna of Peru.—"But poor and scanty as is the vegetation of the Puna, the Animal Kingdom is there richly and beautifully represented. Those regions are the native home of the great Mammalia which Peru possessed before horses and black cattle were introduced by the Spaniards. I allude to the llama and his congeners the alpaco, the huanacu, and the vicuna. On these interesting animals I will subjoin a few observations. The two first are kept as domestic animals; the llama perfectly, and the alpaco partially tame.

"The llama measures from the sole of the hoof to the top of the head, 4 feet 6 to 8 inches; from the sole of the hoof to the shoulders, from 2 feet 11 inches to 3 feet. The female is usually smaller and less strong than the male, but her wool is finer and better. The colour is very various; generally brown, with shades of yellow or black; frequently speckled, but very rarely quite white or black. The speckled brown llama is in some districts called the moromoro.

"The young llamas are left with the dam for about the space of a year, after which time they are removed and placed with flocks. When about four years old, the males and females are separated; the former are trained to carry burdens, and the latter are kept in the pastures of the level heights. Most of the flocks of llamas are reared in the southern Puna provinces, viz.—Cuzco and Ayacucho; and from thence they are sent to the silver mines of North Peru. The price of a strong full-grown llama is from three to four dollars; but if purchased in flocks in the provinces above named, they may be had for one and a half or two dollars each. Shortly after the conquest the price of one of these animals was between eighteen and twenty ducats; but the increase of horses, mules, and sheep, lowered their value. The burthen carried by the llama should not exceed 125 lbs., and the animal is seldom laden with more than a cwt. When the llama finds his burthen too heavy he lies down, and cannot be made to rise until some portion of the weight is removed from his back. In the silver mines the llamas are of the most important utility, as they frequently carry the metal from the mines in places where the declivities are so steep that neither asses nor mules can keep their footing.

"The Indians frequently proceed with large flocks of llamas to the coast, to procure salt. Their daily journeys are short, never exceeding three or four leagues; for the animals will not feed during the night, and therefore they are allowed to graze as they go, or to halt for a few hours at feeding-time. When resting they make a peculiar humming noise, which, when proceeding from a numerous flock at a distance, is like a number of Æolian harps sounding in concert.

"A flock of laden llamas journeying over the table-lands is a beautiful sight. They proceed at a slow and measured pace, gazing eagerly around on every side. When any strange object scares them, the flock separates, and disperses in various directions; and the arrieros have no little difficulty in reassembling them. The Indians are very fond of these animals. They adorn them by tying bows of ribbon to their ears, and hanging bells round their necks; and before loading, they always fondle and caress them affectionately. If during a journey, one of the llamas is fatigued and lies down, the arriero kneels beside the animal, and addresses to it the most coaxing and endearing expressions. But notwithstanding all the care and attention bestowed on them, many llamas perish on every journey to the coast, as they are not able to bear the warm climate.

"Some old travellers have stated that the Indians employ the llama for riding and for draught; but these accounts are quite erroneous. It sometimes happens that

when crossing a river, an Indian lad, to avoid getting wet, may mount on the back of one of the llamas ; but in such a case he immediately dismounts on reaching the opposite bank. The flesh of the llama is spongy and not agreeable in flavour. Its wool is used for making coarse cloths.

“ The alpaco, or paco, is smaller than the llama. It measures from the lower part of the hoof to the top of the head only 3 feet 3 inches, and to the shoulders $2\frac{1}{2}$ feet. In form it resembles the sheep, but it has a longer neck and a more elegant head. The fleece of this animal is beautifully soft and very long ; in some parts it is four or five inches in length. Its colour is usually either white or black ; but in some few instances it is speckled. The Indians make blankets and ponchos of the alpaco wool. It is also frequently exported to Europe, and it sells at a good price in England. The alpacos are kept in large flocks, and throughout the whole of the year they graze on the level heights. At shearing time only they are driven to the huts. They are in consequence very shy, and they run away at the approach of a stranger. The obstinacy of the alpaco is remarkable. When one of these animals is separated from the flock, he throws himself on the ground, and neither force nor persuasion will induce him to rise ; sometimes suffering the severest punishment rather than go the way the driver wishes. Few animals seem to require so imperatively the companionship of its own species, and it is only when brought to the Indian huts very young, that the alpacos can be separated from their flocks.

“ The largest animal of this family is the huanacu. It measures 5 feet from the bottom of the hoof to the top of the head, and 3 feet 3 inches to the shoulders. In form it so nearly resembles the llama, that, until a very recent period, zoologists were of opinion that the llama was an improved species of the huanacu, and that the latter was the llama in its wild state. In the ‘ Fauna Peruana ’ I have explained the erroneousness of this opinion, and described the specific differences existing between the two animals. On the neck, back, and thighs, the huanacu is of a uniform reddish-brown colour. The under part of the body, the middle line of the breast, and the inner side of the limbs are of a dingy white. The face is dark gray, and the lips of a clear white. Of the huanacus there are not those varieties which are found among the llamas and the alpacos. The wool is shorter and coarser than that of the llama, and it is of nearly uniform length on all parts of the body.

“ The huanacus live in small herds of five or seven, seldom exceeding the latter number. In some districts they are very shy, and retreat when any one approaches. If taken very young they may be tamed ; but they are always ready to fall back into their wild state. It is with great difficulty they can be trained as beasts of burthen. In the menageries of Europe huanacus brought from Chile are frequently represented to be llamas.

“ The vicuna is a more beautiful animal than any of those just described. Its size is between that of the llama and the alpaco. It measures from the sole of the foot to the top of the head 4 feet 1 inch, and $2\frac{1}{2}$ feet to the shoulders. The neck is longer and more slender than in either of the other relative species ; and from them the vicuna is also distinguished by the superior fineness of its short curly wool. The crown of the head, the upper part of the neck, the back, and thighs, are of a peculiar reddish-yellow hue, called by the people of the country *color de vicuna*. The lower part of the neck and the inner parts of the limbs are of a bright ochre colour, and the breast and lower part of the body are white.

“ During the rainy season the vicuna inhabits the ridges of the Cordillera, where

some scanty vegetation is to be found. It never ventures up to the naked rocky summits, for its hoofs, being accustomed only to turfy ground, are very soft and tender. It lives in herds, consisting of from six to fifteen females, and one male, who is the protector and leader of the herd. Whilst the females are quietly grazing, the male stands at the distance of some paces apart, and carefully keeps guard over them. At the approach of danger he gives a signal, consisting of a sort of whistling sound, and a quick movement of the foot. Immediately the herd draws closely together, each animal anxiously stretching out its head in the direction of the threatening danger. They then take to flight; first moving leisurely and cautiously, and then quickening their pace to the utmost degree of speed; whilst the male vicuna who covers the retreat frequently halts, to observe the movements of the enemy. The females, with singular fidelity and affection, reward the watchful care of their protector. If he is wounded or killed, they gather round him in a circle, uttering their shrill tones of lamentation, and they will suffer themselves to be captured or killed rather than desert him by pursuing their flight. The neigh of the vicuna, like that of the other animals of its class, resembles a short sharp whistle. But, when the shrill sound vibrates through the pure Puna air, the practised ear can readily distinguish the cry of the vicuna from that of the other animals of the same family.

“The Indians seldom employ fire-arms in hunting the vicunas. They catch them by what they term the *chacu*. In this curious hunt, one man at least belonging to each family in the Puna villages takes a part, and women accompany the train, to officiate as cooks to the hunters. The whole company, frequently amounting to seventy or eighty individuals, proceeds to the Altos (the most secluded parts of the Puna), which are the haunts of the vicunas. They take with them stakes, and a great quantity of rope and cord. A spacious open plain is selected, and the stakes are driven into the ground in a circle, at intervals of from twelve to fifteen feet apart, and are connected together by ropes fastened to them at the height of two or two and a half feet from the ground. The circular space within the stakes is about half a league in circumference, and an opening of about two hundred paces in width is left for entrance. On the ropes by which the stakes are fastened together the women hang pieces of coloured rags, which flutter about in the wind. The *chacu* being fully prepared, the men, some of whom are mounted on horseback, range about within a circuit of several miles, driving before them all the herds of vicunas they meet with, and forcing them into the *chacu*. When a sufficient number of vicunas is collected, the entrance is closed. The timid animals do not attempt to leap over the ropes, being frightened by the fluttering rags suspended from them, and, when thus secured, the Indians easily kill them by the *bolas*. These *bolas* consist of three balls, composed either of lead or stone, two of them heavy and the third rather lighter. They are fastened to long, elastic strings, made of the twisted sinews of the vicuna, and the opposite ends of the strings are all tied together. The Indian holds the lightest of the three balls in his hand, and swings the two others in a wide circle above his head; then taking his aim at the distance of about fifteen or twenty paces, he lets go the hand-ball, upon which all the three balls whirl in a circle, and twine round the object aimed at. The aim is usually taken at the hind legs of the animals, and the cords twisting round them they become firmly bound. It requires great skill and long practice to throw the *bolas* dexterously, especially when on horseback: a novice in the art incurs the risk of dangerously hurting either himself or his horse, by not giving the balls the proper swing, or by letting go the hand-ball too soon.

"The vicunas, after being secured by the bolas, are killed, and the flesh is distributed in equal portions among the hunters. The skins belong to the Church. The price of a vicuna-skin is four reals. When all the animals are killed, the stakes, ropes, &c., are packed up carefully, and conveyed to another spot some miles distant, where the chacu is again fixed up. The hunting is continued in this manner for the space of a week. The number of animals killed during that interval varies according to circumstances, being sometimes fifty or sixty, and at other times several hundred. During five days I took part in a chacu hunt in the Altos of Huayhuay, and in that space of time one hundred and twenty-two vicunas were caught. With the money obtained by the sale of the skins a new altar was erected in the church of the district. The flesh of the vicuna is more tender and better flavoured than that of the llama. Fine cloth and hats are made of the wool. When taken young, the vicunas are easily tamed, and become very docile; but when old, they are intractable and malicious. At Tarma I possessed a large and very fine vicuna. It used to follow me like a dog whenever I went out, whether on foot or on horseback.

"The frequent hunting seems not to have the effect of diminishing the number of these animals. If in the vicinity of the villages where chacus are frequently established, they are less numerous than in other parts, it is because, to elude the pursuit of the hunters, they seek refuge in the Altos, where they are found in vast numbers. Several modern travellers have lamented the diminution of the vicunas, but without reason. In former times these animals were hunted more actively than at present.

"Under the dynasty of the Incas, when every useful plant and animal was an object of veneration, the Peruvians rendered almost divine worship to the llama and his relatives, which exclusively furnished them with wool for clothing, and with flesh for food. The temples were adorned with large figures of these animals made of gold and silver, and their forms were represented in domestic utensils made of stone or clay. In the valuable collection of Baron Clemens von Hügel, at Vienna, there are four of these vessels, composed of porphyry, basalt, and granite, representing the four species, viz., the llama, the alpaco, the huanacu, and the vicuna. These antiquities are exceedingly scarce, and when I was in Peru I was unable to obtain any of them. How the ancient Peruvians, without the aid of iron tools, were able to carve stone so beautifully, is inconceivable.

"Besides the animals above-mentioned, several others peculiar to the Puna are deserving of remark. Among these are the tarush (*Cervus antisienensis*, Orb.); the timid roe, which inhabits the high forests skirting the Andes; the viscacha (*Lagidium peruanum*, May, and *L. pallipes*, Berm.), and the chinchilla (*Eriomys Chinchilla*, Licht.), whose skin supplies the beautiful fur so much prized by the ladies of Europe. The viscachas and chinchillas resemble the rabbit in form and colour, but they have shorter ears and long rough tails. They live on the steep rocky mountains, and in the morning and evening they creep out from their holes and crevices to nibble the Alpine grasses. At night the Indians set before their holes traps made of horse-hair, in which the animals are easily caught. The most remarkable of the beasts of prey in these high regions is the atoc (*Canis Azaræ*, Pr. Max.). It is a species of fox, which is found throughout the whole of South America. The warmer Puna valleys are inhabited by the cougar (*Felis concolor*, L.), or as the Indians call it, the poma. When driven by hunger, this animal ventures into the loftiest Puna regions, even to the boundary of eternal snow. The wild hucumari (*Ursus ornatus*, F. Cuv.) but seldom

wanders into the cold Puna. The hucumari is a large black bear, with a white muzzle, and light coloured stripes on the breast.

"Of the numerous Puna birds, the majority of which may be classed as water-fowl, I will notice only a few of the most characteristic. Next to the condor, the most remarkable bird of prey is the huarahuau, or the aloi (*Polyborus megalopterus*, Cob.);* one of the gyr-falcon species. This bird, which is a constant inhabitant of the level heights, preys on the carcasses of dead horses, mules, &c., but never attempts to meddle with living animals. It is very harmless, and has so little timidity that it suffers itself to be approached near enough to be knocked down with a stick. The acali or pito (*Calaptes rupicola*, Orb.) flutters about the mountains; it is a woodpecker, brown-speckled, with a yellow belly. This bird is seen in very great numbers, and it is difficult to imagine how it procures food in the Puna, where there are no insects. All the other woodpecker species exclusively confine themselves to woody regions.

"The thickets of rushy grass are inhabited by the pishacas, or yutu, a species of partridge (*Tinamotis Pentlandii*, Vig.) which the Indians catch by dogs. These dogs of the Puna Indians are a peculiar race (*Canis Ingæ*, Tsch.). They are distinguished by a small head, a pointed muzzle, small erect ears, a tail curling upwards, and a thick shaggy skin. They are in a half-wild state, and very surly and snappish. They furiously attack strangers, and even after having received a deadly wound, they will crawl along the ground, and make an effort to bite. To white people they appear to have a particular antipathy; and sometimes it becomes rather a venturous undertaking for a European traveller to approach an Indian hut, for these mountain-dogs spring up to the sides of the horse and try to bite the rider's legs. They are snarlish and intractable even to their masters, who are often obliged to enforce obedience by the help of a stick. Yet these dogs are very useful animals for guarding flocks, and they have a keen scent for the pishacas, which they catch and kill with a single bite.

"There is a very curious little bird in the Puna, about the size of a starling. Its plumage is exceedingly pretty, being on the back brown, striped with black; on the throat gray, with two dark stripes, and on the breast white. This bird has the remarkable peculiarity of making a monotonous sound at the close of every hour during the night. The Indians call it the Ingahuallpa, or cock of the Inga (*Thirocerus Ingæ*, Tsch.), and they associate many superstitious notions with its regular hourly cry. The Puna morasses and lagunas are animated by numerous feathered inhabitants. Among them is the huachua (*Chloephaga melanoptera*, Eyt.), a species of goose. The plumage of the body is dazzlingly white, the wings green, shading into brilliant violet, and the feet and beak of a bright red. The lieli (*Charadrius resplendens*, Tsch.) is a plover, whose plumage in colour is like that of the huachua, but with a sort of metallic brightness. There are two species of ibis which belong to the Puna, though they are occasionally seen in some of the lower valleys. One is the bandurria (*Theristocetus melanopsis*, Wagl.), and the other is the yanahuico (*Ibis Ordi*, Bonap.). On the lagunes swim large flocks of quiullas (*Larus serranus*, Tsch.), white mews, with black heads and red beaks, and the gigantic water-hen (*Fulica gigantea*, Soul.). The plumage of the latter is a dark gray, and at the root of the red beak there is a large yellow blotch, in the form of a bean, whence the Indians give this bird the name of *anash sinqui*, or 'bean nose.' Among the few Amphibia found in these region one is

* *Phalacrocorax montanus*, Orb.

particularly remarkable. It is a small kind of toad (*Leiuperus viridis*, Tsch.), and inhabits the boundaries of perpetual snow.

"The grasses of the Puna are used as fodder, and in many of the sheltered valleys there are farms (*haciendas de ganado*) where large herds of cattle are reared. The owners of some of these farms possess several thousand sheep, and from four to five hundred cows. During the rainy season the cattle are driven into the Altos. They graze in those high regions, often at the altitude of 15,000 feet above the sea. When the frost sets in they are brought down to the marshy valleys, and they suffer much from insufficiency of pasture. From the wool of the sheep a coarse kind of cloth, called *bayeata*, is made in the Sierra. Some of the wool is exported, and is much prized in Europe. The old black cattle and sheep are slaughtered, and their flesh, when dried, is the principal food of the inhabitants of the Puna, particularly of the mining population. The dried beef is called *charqui*, and the mutton is called *challona*. The bulls graze in the remote Altos, and most of them are reserved for the bull-fights in the Sierra villages. As they seldom see a human being they become exceedingly wild; so much so that the herdsmen are often afraid to approach them. In the daytime they roam about marshy places, and at nightfall they retire for shelter beneath some overhanging rock. These animals render travelling in many parts of the Puna extremely dangerous, for they often attack people so suddenly as to afford no time for defence. It is true they usually announce their approach by a deep bellow; but the open plain seldom presents any opportunity for escape. On several occasions a well-aimed shot alone saved me from the attacks of one of these ferocious bulls."—*Tschudi's Travels in Peru*.

Zoology of Valparaiso.—"The zoology of the neighbourhood of Valparaiso is not very interesting, though more so along the sea-shore than in parts further inland. Among the Mammalia are sometimes seen the fox (*Canis azarae*, Willd.) and the polecat. In the immediate vicinity of the town a very large mouse is seen in the burrows of the ground; it is of the eight-toothed species (*Octodon Cumingii*, Ben.), and has a brush-formed tail. As the fields round Valparaiso are not cultivated these animals do no harm, otherwise they would be the plague of agriculture, and probably are so in the interior parts of the country. Now and then a sea-dog may be observed in the bay; but the whale is seldom seen, and whenever one appears he is immediately killed, as there is always a whaler at anchor, and not far off.

"In the market, live condors are frequently sold. These birds are caught in traps. A very fine one may be purchased for a dollar and a half. I saw eight of these gigantic birds secured in a yard in a very singular manner. A long narrow strap of leather was passed through the nostrils of the bird and firmly knotted at one end, whilst the other end was fastened to a wooden or iron peg fixed in the ground. By this means the motion of the bird was not impeded; it could walk within the range of a tolerably wide circle, but on attempting to fly it fell to the ground head foremost. It is no trifling matter to provide food for eight condors; for they are amongst the most ravenous of birds of prey. The owner of those I saw assured me that, by way of experiment, he had given a condor, in the course of one day, eighteen pounds of meat (consisting of the entrails of oxen), that the bird devoured the whole, and ate his allowance on the following day with as good an appetite as usual. I measured a very large male condor, and the width from the tip of one wing to the tip of the other was fourteen English feet and two inches, an enormous expanse of wing, not equalled by any other bird except the white albatross (*Diomedea exulans*, Linn.). The snipes (*Scolopax*

frenata, Ill.), found on the little plain between the bay and the light-house, are in colour precisely like those of Europe, from which, however, they differ in having two more feathers in their tails. Small green parrots, little bigger than finches, are tamed and brought to Valparaiso from the interior of the country. These parrots are very docile, and are easily taught to speak; but they cannot endure cold, and require to be tended with very great care. In the bay itself there are numerous cormorants, and occasionally penguins and large flights of the cut-water or shear-bill (*Rhynchops nigra*, Linn.). The latter is distinguished by a sharp-pointed bill closing laterally, the under mandible being about double the length of the upper one. But the most beautiful bird in the Bay of Valparaiso is the majestic swan (*Cygnus nigricollis*, Mol.), whose body is of dazzling white, whilst the head and neck are black."—*Id.*

Zoology of Chiloe.—"In the interior of the island of Chiloe there are few quadrupeds. The largest, the domestic animals excepted, is a fox (*Canis fulvipes*, Wat.), which was first discovered by the naturalists who accompanied Captain King's expedition. This is the only beast of prey. The coast abounds in seals of the sea-dog species (*Otaria chilensis*, Müll., *Otaria Ursini*, Per., *Otaria jubata*, Desm.), in sea-otters, (*Otaria chilensis*, Ben.), and in the water-mouse (*Myopotamus coypus*, I. Geoff.). Among the birds, there are some very fine species of ducks, well worthy of notice, which are also found on the continent of South America. There is the little cheucau (*Pterotochus rubecula*, Kettl.), to which the Chilotes attach various superstitious ideas, and pretend to foretel good or ill luck from its song. The modulations which this bird is capable of uttering are numerous, and the natives assign a particular meaning to each. One day, when I wished to have some shooting, I took an Indian lad with me. Having levelled my gun at one of these birds, which was sitting in a low bush, and uttering its shrill 'huít-huít,' my young companion firmly grasped my arm, earnestly entreating me not to shoot the bird, as it had sung its unlucky note. But my desire to possess a specimen was too great to be thus baffled, so I fired my gun and brought it down. I was engaged in examining this elegant little bird, when a mule, probably alarmed by the shot, came running at full speed towards the spot where we were, and we deemed it prudent to get behind a hedge as speedily as possible. The infuriated mule made an attack on my gun, which was resting against the hedge. It was thrown down, bitten, and trampled on by the mule. The Indian boy turned to me with a serious countenance, and said, 'It is well if we escape further danger,—I told you the bird had piped bad luck!'—*Id.*

Animals in the Bay of Callao.—"The lover of Natural History finds in the bay of Callao numerous opportunities for gratifying his curiosity. The Mammalia are not very numerous. Sea-otters and sea-dogs are found there, as on all parts of the South American coast. Two species, (the *Otaria aurita*, Humb., and the *O. Ulloæ*, Tsch.) inhabit the southern declivity of the Fronton. I went to hunt seals on the rock with the officers of a French ship of war. When we landed, which was difficult on account of the breakers, we fired at the animals and killed a number of them. A sailor waded through the breakers and bound the dead seals with a rope, by which he drew them on board. As we shot a great number of birds, the Chilean admiral on hearing the firing, thought that one of his ships must be engaged with the Peruvian corsairs; and, therefore, sent out the 'San Lorenzo' brig-of-war to see what was going on.

"The bay abounds in fine water-fowl. Amongst the most remarkable is Humboldt's penguin (*Spheniscus Humboldtii*, Mey.). A few are smaller than the common gray penguin, and one is somewhat different in colour on the back and breast. The

Peruvians call it *paxaro nino*, or 'child-bird.' It is easily tamed, becomes very social, and follows its master like a dog. It is amusing to see it waddling along with its plump body and short legs, and keeping itself in equilibrium by moving its floating wings. I had one completely tame, which I bought from an Indian. It was named *Pepe*, and it answered readily to the name. When I was at my meals he regularly placed himself beside my chair, and at night he slept under my bed. When he wished to bathe he went into the kitchen and beat with his bill on an earthen pan until somebody threw water over him, or brought him a vessel full of water for a bath.

"I brought away a few of the marine birds which appeared the most remarkable. Among them was the banded cormorant (*Carbo Gaimardi*, Less.). On the back it is gray, marbled by white spots; the belly is fine ash-gray, and on each side of the throat there runs a broad white stripe or band: the bill is yellow and the feet are red: the iris is peculiar, I never saw its like in any other bird; it changes throughout the whole circle in regular square spots, white and sea-green. Thousands of the spotted gannet (*Sula variegata*, Tsch.) inhabit the rocks of the island of San Lorenzo. This bird is the greatest producer of guano. The inca tern (*Sterna luca*, Less.) is without doubt the finest of the whole tern family. The colour of the head is brown-gray, getting darker towards the tail, and brighter on the lower body. From the root of the bill on either side there shoot out some white feathers, slightly curving, so that they give the appearance of white mustachios. Among the land birds are some very fine colibri (*Trochilus Amazilia* and *T. cora*, Less.). The horse-protector (*Crotophaga sulcata*, Swains.) is a singular animal. It is about the size of a starling, with a short compressed and curved bill, having several deep furrows along its sides: the tail is long and fan-shaped: the whole body is of a deep blue colour, with a slight metallic brightness. The bird is very social with cattle of all kinds, and more particularly with horses. It is fond of perching on the back of a horse or an ass and searching for insects, which it finds there in abundance. These animals are very sensible of the service thus rendered to them, and by the manner in which they move about when the bird is perched on their heads or necks, show how much they are gratified by its presence.

"Foreigners, when they visit the coast of Peru for the first time, are much surprised at the immense number of birds of the vulture species which they meet with about the roads and on the roofs of the houses. In Callao and in all other ports, the Turkey vulture (*Cathartes aura*, Illig.) is frequently seen. It is called by the Spaniards *gallinazo à cabéza colorado*, or 'red-headed vulture.' Further in the interior of the country it is frequently seen, though there it is less common than the black *gallinazo* (*Cathartes fœtens*, Illig.). The colour of the former is dark brownish-black; the unplumed head and throat are red; the throat is full of wrinkles and warts. The latter is very like it in size and colour, only the head and neck are grayish-black. These birds are the size of a turkey-cock; but they are lankier and more angular in form. The black-headed *gallinazo* is inactive, heavy, and seldom flies far. When seeking food he hops about on the ground in short regular springs. When he wishes to move faster forward he helps himself with his wings, but without flying. Its cry is seldom heard, and never long continued. At noon, sometimes from sixty to eighty of these birds perch themselves on the tops of the houses or on the adjoining walls, and with the head under the wing they all go to roost. They are extremely voracious, and devour every sort of animal substance they can find, however filthy it may be. They are not in the least degree shy, for they hop about among men and cattle in the most

populous places. The turkey-vulture is far more lively, and its movements are more light. It flies faster, and continues longer on the wing than the black-headed gallinazo. It is, however, more timid. It nestles in sandy rocks and uninhabited islands. The female lays three or four whitish eggs, which are hatched in February and March. The common gallinazo usually builds its nest on the tops of houses, churches, ruins, and high walls. The female lays three or four eggs, which are whitish-brown and speckled, and are hatched in the same months as the eggs of the turkey-vulture.

"Among the Amphibia of Callao, the iguana and land agama are numerous. Snakes abound in the low bushes at the mouth of the Rinac, and some kinds, which are venemous, live on the arid sand-banks. All the sea-tortoises have been driven out of the bay, and now inhabit the detached creeks of the uninhabited parts of the coast.

"The kinds of fish are numerous. Sharks, rays, balancers, corvinas, bonitos, &c., are caught in abundance. Most of the corvinas and bonitos are carried to market. The flesh of the latter is firm, dry, and less savoury than the corvina. The pexe-rey, or 'king fish' is superior in flavour to the pexe-sapo, or 'toad-fish,' which is a little larger, and has a thick fleshy head. These fish are taken on rocks and under water, where they are struck by a kind of harpoon-hooks and drawn out."—*Tschudi's Travels in Peru.*

Habits of a Bat in Confinement.—I think I mentioned to you a bat which I succeeded in taming; if the following particulars of it will afford you a few minutes' amusement I shall be amply repaid for my trouble in communicating them to you. The little creature was picked up late in the autumn of 1846, when insects began to be scarce, apparently crippled from some accident, and from being the most irascible little animal possible, it became by merely putting two or three small pieces of butter into its mouth, all at once perfectly tame. It would follow a fly held between the fingers; crawl or hop across the table and upon our hands or arms with the greatest effrontery. It would look as wistfully for food as though it had been brought up a pet. One of our amusements was (before putting it into its box) to nip off part of the wing of a living fly and watch his mode of attack, which was very fierce. If it missed its aim, its next tactic was to use its long arm, to get it under its body: it would turn and curl the membranous part of its tail inwards, forming a complete sack, into which, if it succeeded in getting its prey, it would thrust its head for the purpose of capture. But if, as it most frequently happened, the insect was only caught by a wing, then it would most adroitly kick it into its mouth with one of its hinder feet, its fore-arm being too long for the purpose. It would eat wood-lice when its favourite food, flies, could not be obtained; but an earwig was its utter abomination, at which it would set up the hair of its back, draw in its nose, and exhibit signs of extreme disgust. When in a dormant state, it was soon revived by the warmth of the hand, or by being brought near the fire; or if the room was warm, it would soon let us know that it was alive. If its revival was brought about by too hasty means, it would tremble violently with strong palpitations, refusing for some time any proffered food, and evidently suffered very much. When aroused it would generally eat about twenty flies (and the larger sort it was equally fond of), preferring them to everything else. It was evident, however, that nature required something else, as it remained poor, and made none of

that fatty tissue which overlays the whole upper part of the back in winter, and which is clearly a wise provision to sustain life and warmth during the torpidity of the long winter months. It drank but little; now and then it would take a drop of milk from the tip of the finger. After eating it used to lick its jaw with great satisfaction, and after awakening it invariably uttered a shrill cry before it seized the first mouthful. One day, after the winter had set in, being called upon to exhibit its antics for the amusement of some ladies, its legarthic slumbers were broken too quickly, and too incautiously, and although as lively as usual, it did not resume its hibernation so soon as heretofore. Alas! it was its last display. Nature's laws will not be broken with impunity, and in a few days it had shared the fate of all pets, and now nothing remains of it but its effigy.

Description.

	in.	lin.
Length of Head and Body	1	9
„ Head only.....	0	6
„ Tail	1	1½
„ Ears	0	3
„ Tragus	0	2¼
Breadth of Ears	0	3
„ Tragus	0	1½
„ Fore Arm	1	3
„ Thumb	0	1¾
Extent of Wing	7	3

Muzzle short: nose strongly notched in front, covered with rather long hair, slight protuberance on each side: eyes very small, no wart of any kind above: ear somewhat triangular, notched nearly half way from the head: tragus rather broader at base, and rather obtuse: fur extremely silky, black, except the tips, which are dark reddish-brown above, and on the under parts a shade or two paler.

This description, although nearly agreeing with *Vespertilio pipistrellus*, appears to differ from that species in the following items:—

Less extent of wings,—no wart over the eyes,—less notched ears,—and the fur being black throughout except the tips.

As bats bring forth their young in the earliest spring, I did hope it had been a female, but dissection proved the contrary.—*Joseph Clark*; * *Saffron Walden, April 30th, 1847.*

Voracity of the Mole.—A few weeks since, when walking in the country, I surprised a mole, which had ventured out of his burrow, and had slipped into a wheel-rut. The capture was easily made, and wishing to witness the rapid manner in which such animals can work themselves into the ground, I determined to take it home, and thrust my captive into a middling-sized pocket, of what is usually termed a shooting-jacket. Few persons are aware of the great power possessed by this creature in its fore-paws, and it requires considerable pressure to hold it in the hand. If the snout is inserted between the finger and thumb (and this is done with great address) the body is in a moment forced from the palm of the hand, by the application of these powerful limbs. I found it continually endeavouring to escape by clambering to the upper part of the pocket, and only by holding the top together did I prevent its getting out. In an ad-

* Communicated by C. R. Bree, Esq., of Stowmarket.

joining field I caught a field-mouse, and without thinking of the probable consequences of a disagreement of the parties, I thrust the poor little innocent into the same pocket. The mole greeted the new comer with a savage grin, and both fell to the bottom of the pocket, when there soon occurred a regular rumpus between them. In about an hour I reached my home, and intending to place the animals in a birds's cage, my astonishment was great indeed to find, that nothing remained of the poor mouse but the head and fore legs, with a few of its ribs. However, I thrust the mole into the cage, and placed it upon a table with a lamp beside it, which threw a strong light into it. The mole showed no signs of fear, but applied his powerful fore paws to the wires of the cage, which he bent with the greatest ease, making most desperate efforts to escape. I then placed the remains of the mouse in the cage, and the ferocious creature pounced upon it immediately, and with ravenous eagerness cracked his victim's bones, and soon finished his meal, not in the least heeding the close proximity of several persons, who with myself were much surprised at his boldness. The creature escaped from the cage the next morning, and has managed to keep concealed in a walled yard, with a wood house, where I expect some day to find some traces of his presence.—*W. H. Bensted; Maidstone, February, 1847.*

Anecdote of a Hedgehog.—I send the following account of a hedgehog (*Erinaceus Europæus*, Linn.) if you think it worth inserting in the 'Zoologist.' It shows that opportunities are sometimes afforded for observing the habits and manners of the wild animals if proper precautions are used. In passing along a walk through a wood, the other day, I observed at a short distance from the walk a hedgehog, busily occupied in searching for food amongst the grass, dry leaves, &c. in the wood; the little animal soon appeared to detect my presence, but after snuffing the air for a few moments, seemed satisfied that there was no cause for alarm, and continued its search for food; I remained motionless in the walk, and presently the animal came into the walk, and passed across it to my feet and commenced licking my boot.—*H. J. I. Brydges; Bonitibrooke, April 23rd, 1847.*

Food of the Water-Rat.—Perambulating yesterday, I chanced upon a water-rat, squatted in a luxuriant bed of coarse young grass which forms an island in the middle of a brook: he was eating the fresh grass-piles with great diligence, biting them off skilfully at the base, and eating upwards, exactly as a rabbit is wont to do. I was within two yards of him, and he allowed me to watch him very coolly, continuing his feast.—*Henry Daniells; Exon, April 22nd, 1847.*

White variety of the Field Vole (Arvicola agrestis).—A few weeks since I obtained a freshly killed specimen of what appeared to me to be a new species of vole; however, on examination, I cannot find sufficient difference to justify that supposition. Nevertheless, I will state my reasons for thinking it distinct, as it is quite possible that other collectors may meet with similar individuals. The general colour is white, but not albinism, the fur having more the appearance of being changed by season, as is known to be the case with the alpine hare. Indeed, the colour nearly resembles that of the latter species, being grizzled with gray along the whole length of the back. The colour of the back of a field vole is brown, and therefore we might expect the mixture in the variety I speak of, to be of that colour instead of gray. The fur also appears to be of a coarser kind than in the specimens of *A. agrestis* which I have examined. I am quite unable to give any authentic measurements, as it had been preserved—that is, mutilated—by a country stuffer before I received it. Professor Bell, in his 'British Quadrupeds,' states the ears of *A. agrestis* to be five inches, this

of course must be an oversight, five lines is the length of the ears, as stated by Jenyns, in his 'Manual.' A friend of mine had a black variety of either *A. agrestis* or *A. riparia* (Yarrell), both of which species are common here. He was a very knowing fellow, and I should think he must have had an intuitive knowledge of my scapel and dissecting forceps, for he very cleverly contrived his escape only a few hours before the time appointed for him to come into my possession. — *R. F. Tomes; Stratford-on-Avon, May 8th, 1847.*

Ornithological and other Observations, in Norfolk for the month of April, 1847.

In our observations for the month of January last (Zool. 1691) we mentioned the appearance at Brooke of a bird, supposed to be the snowy owl. We have now to announce the capture of a specimen of that species, which, judging from the time and place of its first appearance, as mentioned below, is probably the same bird which had been previously noticed.

We are indebted to F. M. Spalding, Esq., in whose possession the bird now is, for the following particulars of its occurrence:—"It was first observed," says Mr. Spalding, at Heddenham Wood, and when first seen there, was remarkably tame. It visited a farm-house and barn at Thwaite, where some white pigeons were kept, all of which soon after disappeared. While shooting at Tindal Wood, this owl came over us, but at too great a distance to be brought down; from this time I heard no more of our northern visitor till I was told that a bird of this kind had been shot at St. Andrews, in Suffolk, by a person named Adams, and carried by him alive to Bungay. I shortly after visited St. Andrews, and obtained a sight of the bird, which seemed perfectly well, with the exception of a broken wing. It was shot from the stump of a pollard elm, whence it had been seen to dart down into the field, and then to return to its perch. It had been observed in the locality for several days, and was shot on the 19th of February, and brought to my house dead on the 13th of April. It proved to be a large female, in rather dark plumage, and measured two feet in length, and five feet in extent of the wings." It, therefore, appears that this owl had remained about a month in the district before it was shot.

A female of the lesser spotted woodpecker occurred early in the month at Blickling, the locality referred to in our last notice as favourable for this species.

We may also notice the (somewhat late) appearance of the male of the common pochard on the 19th of April; of an avocet, at Salthouse, on the 24th; and of the ring ousel, and the wood sandpiper, at Yarmouth, at the end of the month.

On the 27th of April, a solitary male specimen of the Barbastelle bat (*Barbastellus Daubentonii*, Bell), a species which we believe has not been before noticed to have occurred in Norfolk, was found at Easton, behind the bark of a pollard oak. The inactivity of this bat is mentioned by Mr. Bell, in his work on the British Quadrupeds; and the specimen which we have mentioned, although taken so late as $\frac{1}{2}$ past 6, p.m., was almost torpid. It had several minute orange-coloured ticks or acari imbedded in the skin at the outer edge of each ear.

With reference to Mr. Newton's notice (Zool. 1693), of the occurrence of the barred woodpecker, at Barningham, may we be allowed to inquire whether Pious

major or *Picus minor* was the species captured?—*J. H. Gurney, William R. Fisher; May, 1847.*

Notes on the Partial Migration of Birds in Roxburghshire.—Many of our resident birds are in some measure migratory and shift their quarters, at certain seasons in most cases, but in others at uncertain periods. To trace these movements is, undoubtedly, an interesting occupation, and, as our Editor requests contributions on the subject, I shall put together the observations I have made in this locality, following the footsteps of Mr. Hepburn (Zool. 1332), and Mr. Briggs (Zool. 1470).

Of the few birds of prey which frequent this district, I am unable to record anything decided as to partial migration. The range of this order of birds is so extensive, and their habits and food require such long excursions and frequent changes of residence, that it is difficult to ascertain their movements with any degree of certainty: their wild and wary nature, also in great measure, precludes accurate observations.

The first bird I shall mention as a partial migrant is the missel thrush. After rearing their broods in the neighbourhood of man, these birds collect into flocks, and in the autumn months are to be found on moors and in upland districts, where they feed upon the berries of the mountain-ash and other wild fruits. During winter, a straggler is occasionally seen in severe weather, but the main body do not again appear till after the turn of the year, when their wild notes may be heard re-echoing through the leafless woods in every part of the country. They have generally paired when they return.

The song thrush also leaves this district for a time in the depth of winter, generally in the month of November, and returns with the first mild weather in spring. I have recorded this fact in a previous volume of the '*Zoologist*' (Zool. 493), and my friend, Mr. Hepburn has ascertained a similar migration in East Lothian. These birds, are, however, not very regular in their departure and arrival, being much influenced by the state of the weather.

The gray and pied wagtails (*Motacilla boarula* and *Yarellii*), both leave this district in winter, and their summer haunts may then be visited repeatedly without a bird of either species being seen. At times, however, a straggler appears in the neighbourhood of houses during the winter, but soon disappears again. In spring (generally in the end of March), these birds return and breed by our streams and rivers.

Another partial migrant is the meadow pipit, which in this locality breeds chiefly on moors and uplands, and is seldom found in the lower grounds. It leaves us in October, and does not return till March or April, when I have sometimes seen large flocks, apparently just arrived from their winter quarters. These birds are often a great nuisance to shooters in autumn, frequenting stubbles and turnip-fields in great numbers, and, especially in the latter, deceiving the dogs.

The skylark migrates similarly to the meadow pipit, and there are none to be found in our fields from November to March, save perchance now and then a straggler. Their arrival and departure are, however, by no means certain, and are greatly influenced by the mildness or severity of the season.

The reed-bunting is not an abundant species here, but is generally distributed. Most of those which breed with us leave us at the approach of winter, but a few are occasionally found associating with chaffinches and yellow-buntings, in the vicinity of farm-yards throughout that period.

The goldfinch is a rare bird in this locality, but flocks are sometimes seen in autumn, feeding upon thistles, in the level haughs or commons by the Teviot. Mr.

Newman states (Zool. 983), that the goldfinches which breed in Herefordshire disappear during winter; and I suspect that this bird makes wide and extended changes of abode, which may perhaps be owing to the peculiar nature of its food, principally seeds of syngenesious plants.

The common linnet collects into flocks at the approach of winter, but does not frequent homesteads or farm-yards like other Fringillidæ. Sometimes I have met with small parties in severe weather, feeding on the seeds of ragwort, or black knapweed (*Centaurea nigra*), but in general, linnets are not seen with us during winter. In early spring, however, flocks occasionally appear.

The siskin and the lesser redpoll may be classed together as irregular visitants to this district. The habits of these two species are very similar, and they only appear at uncertain periods, generally in winter or early spring. I have seen redpolls so late as the end of April, when they fed on the seeds of the larch. Neither of these birds breeds here.

The starling may be termed a summer visitant in this locality, a few pairs appearing in spring to breed. In autumn large flocks are occasionally seen, frequenting large open fields, but in winter none are visible. The starling is rather a rare bird here, and affects particular localities, being by no means generally distributed.

The golden plover, the lapwing, and the curlew visit our moors and uplands to breed, appearing in March or April, and leaving us in autumn. Curlews are the first to depart, generally disappearing in the month of August. Golden plovers remain till October, and are to be seen in large flocks in August and September, frequenting bare places on upland moors. Lapwings also collect into large flocks and remain somewhat later, resorting to large open fields in the lower districts of the county, where I have sometimes observed them so late as November.

The common sandpiper breeds by our streams and rivers in abundance, almost every stream having several pairs of these birds stationed at intervals on its banks. They leave us early in autumn.

The ring-dotterel is also a summer visitant here, appearing in April or May, but it is by no means a common bird, and is only to be found by large rivers where extensive gravel-beds abound. It is somewhat a nocturnal bird, and I have observed it flying about and uttering its plaintive note, while fishing in the Teviot by night. It also departs early in autumn.

I have not observed any partial migrations of Natatorial birds, save that of the black-headed gull, which breeds at Ancrum Moss, in this neighbourhood in abundance. These birds appear in March, and leave us again in the end of July. In the first volume of the 'Zoologist' (Zool. 245) I have given a short description of the habits of the black-headed gull.

Other species of gulls are occasionally observed by our rivers, but make no stay. In severe weather, goosanders, golden-eyes, and teals are to be found on our larger rivers, but other ducks are rare, except the common wild duck, which is a constant resident.

I have thus gone over our common birds which may be considered as partial migrants, and have stated my own observations on their movements, and the times of their arrival and departure. I trust that these remarks will call forth responses from other parts of the kingdom, and that, ere long, we shall have the history of the migrations and shiftings of the interesting inhabitants of the woods and fields more accu-

rately determined and traced than it is at present.—*Archibald Jerdon ; Roxburghshire, May 8th, 1847.*

Curious Ornithological Record.—A very curious fact touching the former ornithology of Middlesex, and the economy of London, is mentioned by the old naturalist, Charles Clusius, in a note to his translation of the works of the French ornithologist, Pierre Belon: as I have never seen it recorded anywhere else, it may perhaps be worth inserting in the 'Zoologist':—

"Vix majorem in Cairo milviorum frequentiam conspici existimo, quam Londini Trenobantium in Britannia, qui nullo non anni tempore frequentissimi istic apparent, cum eos enim interficere vetitum sit, ut spurcitiam in plateas, vel etiam ipsum flumen Thamesin qui urbem alluit ab incolis ejectum, legant et devorent; maximâ quantitate eò confluent, adeoque cicures redduntur, ut per confectos etiam homines prædam ab ipsis in alto volantibus conspectam, comissere non vereantur, quod sæpenumero dum istic essem, admiratus sum."—*Opera C. Clusii, p. 108,*

Clusius visited England about the reign of Charles 1st, and a fact like this of daily occurrence, and therefore little likely to be recorded by a native of London, would strike a foreigner as remarkable. Now, as the kite is becoming one of our rarer birds, and is hardly ever seen in the neighbourhood of London, this reminiscence of its former frequency, when a welcome guest, and before the deadly invention of the modern fowling-piece, had rendered the wings even of this powerful bird but a poor safe-guard, may not be unwelcome to ornithologists.—*Charles Prentice ; 1, Oxford Villas, Cheltenham, April 13th, 1847.*

The Condor.—"In these sterile heights Nature withholds her fostering influence alike from vegetable and animal life. The scantiest vegetation can scarcely draw nutriment from the ungenial soil, and animals shun the dreary and shelterless wilds. The condor alone finds itself in its native element amidst these mountain deserts. On the inaccessible summits of the Cordillera this bird builds its nest, and hatches its young in the months of April and May. Few animals have obtained so universal a celebrity as the condor. That bird was known in Europe, at a period when his native land was numbered among those fabulous regions which are regarded as the scenes of imaginary wonders. The most extravagant accounts of the condor were written and read, and general credence was granted to every story which travellers brought from the fairy land of gold and silver. It was only at the commencement of the present century that Humboldt overthrew the extravagant notions that previously prevailed respecting the size, strength, and habits of this extraordinary bird.

"The full-grown condor measures, from the point of the beak to the end of the tail, from four feet, ten inches, to five feet; and from the tip of one wing to the tip of the other, from twelve to thirteen feet. This bird feeds chiefly on carrion: it is only when impelled by hunger that he seizes living animals, and even then only the small and defenceless, such as the young of sheep, vicunas, and llamas. He cannot raise great weights with his feet, which, however, he uses to aid his beak. The principal strength of the condor lies in his neck and in his feet; yet he cannot, when flying, carry a weight exceeding eight or ten pounds. All accounts of sheep and calves being carried off by condors are mere exaggerations. This bird passes a great part of the day in sleep, and hovers in quest of prey chiefly in the morning and evening. Whilst soaring at a height beyond the reach of human eyes the sharp-sighted condor discerns his prey on the level heights beneath him, and darts down upon it with

the swiftness of lightning. When a bait is laid, it is curious to observe the number of condors which assemble in a quarter of an hour, in a spot near which not one had been previously visible. These birds possess the sense of sight and smell in a singularly powerful degree.

"Some old travellers, Ulloa among others, have affirmed that the plumage of the condor is invulnerable to a musket-ball. This absurdity is scarcely worthy of contradiction; but it is nevertheless true that the bird has a singular tenacity of life, and that it is seldom killed by fire-arms, unless when shot in some vital part. Its plumage, particularly on the wings, is very strong and thick. The natives, therefore, seldom attempt to shoot the condor: they usually catch him by traps, or by the laso, or kill him by stones flung from slings, or by the *bolos*. A curious method of capturing the condor alive is practised in the province of Abancay. A fresh cowhide, with some fragments of flesh adhering to it, is spread out on one of the level heights, and an Indian provided with ropes creeps beneath it, whilst some others station themselves in ambush near the spot, ready to assist him. Presently a condor, attracted by the smell of the flesh, darts down upon the cowhide, and then the Indian who is concealed under it seizes the bird by the legs, and binds them fast in the skin, as if in a bag. The captured condor flaps his wings, and makes ineffectual attempts to fly; but he is speedily secured, and carried in triumph to the nearest village.

"The Indians quote numerous instances of young children having been attacked by condors. That those birds are sometimes extremely fierce is very certain. The following occurrence came within my own knowledge, whilst I was in Lima. I had a condor, which, when he first came into my possession, was very young. To prevent his escape, as soon as he was able to fly, he was fastened by the leg to a chain, to which was attached a piece of iron of about six pounds weight. He had a large court to range in, and he dragged the piece of iron about after him all day. When he was a year and a half old he flew away with the chain and iron attached to his leg, and perched on the spire of the church of Santo Tomas, whence he was scared away by the carrion hawks. On alighting in the street, a negro attempted to catch him for the purpose of bringing him home; upon which he seized the poor creature by the ear, and tore it completely off. He then attacked a child in the street (a negro boy of three years old), threw him on the ground, and knocked him on the head so severely with his beak, that the child died in consequence of the injuries. I hoped to have brought this bird alive to Europe; but, after being at sea two months on our homeward voyage, he died on board the ship in the latitude of Monte Video."—*Tschudi's Travels in Peru*.

Occurrence of the Scops Eared Owl at the Scilly Islands.—I received yesterday from Mr. James, the steward of the lord-proprietor of the Scilly Islands, a very good specimen of the scops owl. It was reported to me to have been caught in the past week on the grounds of Mr. Smith, the lord-proprietor in the island of Tresco, and I should imagine that it must have been disabled from flying, by exhaustion, after having performed a migratorial flight, as the bird does not exhibit any bodily injury. The finding this bird at the present season of the year in such a locality, seems to confirm the supposition that this species visits Europe in the summer from Africa and the warmer regions of the earth. Nothing can exceed the beautiful pencilled markings of its plumage, quite equalling the night jar in the delicate tints of browns, and exhibiting a similar arrangement of them, as in that bird, only in corresponding miniature.—*Edward Hearle Rodd; Penzance, April 13th, 1847.*

Does the Cuckow carry its Eggs?—There is an interesting point in the habits of the cuckow, which perhaps some of the readers of the ‘*Zoologist*’ may be able to decide from their own experience. I mean the mode in which it conveys its eggs into the nests of the birds to whose care it confides them: it seems probable it carries them in its mouth. If I remember right, Le Vaillant shot a species of cuckow in Africa, with one of its own eggs in its throat. Mr. Williamson, of the Scarborough Museum, informed me, several years ago, that he had found a cuckow’s egg in a nest, which was placed so close under a hedge, that the cuckow could not possibly have got into it; and this morning I purchased a cuckow’s egg from Mr. Bartlett, of Little Russell-street, which he had found himself (I believe last year) in a robin’s nest that was placed in so small a hole, that he believed the cuckow must have put her tail over her head, and backed in. By the bye, rather a curious point connected with this case is, that the robin’s eggs were nearly ready to hatch, whilst the cuckow’s seemed not to have been sat upon many days; an apparent carelessness, or want of discrimination on the part of the cuckow. Mr. B., at first glance into the nest, thought some one had put a nightingale’s egg into it, but it is a most unmistakeable cuckow’s. An American nightjar, having had its eggs disturbed, has been seen to take them up in its claws, and fly away. Probably, many birds move their eggs in the same way. But that the cuckow carries its eggs in its mouth or throat, is not rendered less probable by the common report that it sucks eggs to clear its voice.—*T. Wolley; Mount Street, Grosvenor Square, May 1st, 1847.*

Date of the Cuckow’s Arrival at Whitehaven.—The cuckow was heard in this neighbourhood as early as the 27th of April.—*John Dixon; 3, Duke Street, Whitehaven, May 9th, 1847.*

On Jackdaws Nests. Do Birds of the Crow tribe cover their Eggs?—I have a fact to offer on this disputed point. About ten days ago Henry Walter and myself amused ourselves by climbing up to jackdaws’ nests, placed in holes in the trees, about Bearwood, which is on the borders of Windsor Forest. In the course of three days we must have examined several score of nests. On the first day none of the eggs were covered; but on the second and third days, we found that several of the nests that had been visited before, now had their eggs either partially covered by loose pieces of wool, or the eggs, in some cases, were nearly buried in the woolly lining of the nest; and this, whether the bird had just flown from the nest or not. So far on this much quarrelled subject.* With respect to the make of the nests, it is curious how they were adapted to circumstances; in some cases, only a little wool and such like soft materials; in others, a monstrous pile of sticks to stop some inconvenient cavity of the tree. Mr. Jesse tells the story of the extraordinary nest in the bell turret at Eton; I saw it myself, and it really was almost beyond belief: many people thought Gray, the sly old clerk, had built it; but there is no doubt it was entirely the work of the birds. It was remarkable in not being of a pyramid shape, but taking its rise from two or three steps of the circular stairs it was built up compactly, and of a nearly uniform breadth, to a lancet window in the perpendicular wall, the bottom of which window was not otherwise sufficiently wide to support a nest. I forget the whole height of the nest, but I should guess not less than nine feet. It was unfortunately removed not long after it was built, though in the mean time it was a matter of

* By Mr. Waterton and others. *Vide* ‘*Magazine of Natural History.*’

great profit to old Gray. Somewhat similar instances of vast piles of sticks collected by jackdaws are not uncommon: they will sometimes fill almost a whole chimney with sticks. At the foot of some of the trees at Bearwood I saw heaps of sticks, to the extent of several barrow loads, recently dropped by the jackdaws. The keeper assured us several birds will lay in one nest, and we frequently saw three birds fly out of the same hole, and in one case found two eggs in a nest we had robbed the day before. Six was the greatest number of eggs we found in any nest, but very few had this number, or indeed more than one or two eggs, as it was early in the year. The jackdaws generally flew out long before we got near the trees, but in one case, by creeping up stealthily, I looked into a hole where a jackdaw was sitting: she did not lose her presence of mind, but remained perfectly quiet: I repeated the experiment several times with the same result: it was in a hole within a yard of the ground. Their eggs vary from one another very much less than those of most others of the tribe do. Rooks vary exceedingly.—*J. Wolley; Mount Street, Grosvenor Square, May 3rd, 1847.*

Anecdote of Carrion Crows.—The winter before last a pair of carrion crows were constantly about my father's house. Three times during the winter I killed one of the pair, and each time the survivor, after an absence of a few days, returned with another mate: they at length built in an elm-tree near the house, and I killed the hen while she was hatching her eggs. During the past winter a pair were again constantly about the house, and this spring they repaired the last year's nest, and eggs were deposited in it. I believe the fact of a carrion crow repairing his last year's nest is uncommon, at least I never observed it before.—*W. W. Cooper; West Rasen, Lincolnshire, May 11th, 1847.*

Blackbirds Nest on the Ground.—Yesterday my attention was attracted by a hen-blackbird rising from the ground in the middle of a large wood: on looking at the place where she rose, I found a nest with five eggs in it, placed on the ground at the foot of a hazel-bush. The part of the wood where the nest was, is full of hazels and blackthorns, with an occasional bush of brambles and wild roses. In the material of the nest was nothing extraordinary. In the same wood I have found another blackbird's nest with three eggs, in a curious place. It was on the stump of a hazel, which had been cut as brushwood, and from which several stems had grown. It was not raised an inch from the ground, but quite surrounded by the new wood. Not far from the same place I found a nest of a common song thrush *on the ground*, under a strong plant of *Heracleum Sphondylium*, not less than three feet from the nearest bush. The old bird was sitting on five eggs.—*Id.*

The Missel Thrush, or Storm Cock.—This bird is generally considered as being of a wild nature, and is but a rare visitor in some places, excepting perhaps in the winter and spring, and then only are one or two pair or a few individuals to be met with.

In some parts of England it is seldom seen at all at any period of the year, and again, in other more favoured situations, this bird is a constant visitor, remaining throughout the autumn, winter, and spring, and often all the year round, forming its nest in the forked branch or hollow of some old tree, and bringing forth and tending its young with much care, and without then showing the natural shyness it evinces at most other times. Formerly it was an unusual thing in this neighbourhood to see more than one or two pair of these birds during the year, but within the last eight or nine years they have very much increased in this locality. It is now a common occurrence to see, either in small parties or in pairs, from twenty to thirty mistletoe thrushes immediately about the house and lawn, where they remain all the year. I think it is

doubtful whether, when once paired, these birds ever separate, as they are constantly seen in pairs at all periods of the year, as well as occasionally in little parties of three, four, or five together, seldom more; but may not these little parties be formed by the young which remain with the parent-birds until the former separate off for pairing in the ensuing spring, from never allowing them to be shot at, or unnecessarily disturbed? They are constantly in the habit of coming on the grass-plot close under the windows, or perching on the iron chains which keep the cattle from approaching too near the house; and, although always upon the alert and ready to take alarm, they will allow a person to stand and look at them through the windows, if quietly approached, and observe them without showing much fear; but the moment any person or other object suddenly appears, they constantly fly off to a more safe distance. The young birds at first, when full fledged are much lighter in colour than the old birds, and appear to have irregular blotches of darker feathers, interspersed with those of a lighter hue, which gives them a mottled appearance: these young birds when feeding in the grass fields or perched upon a rail, seem quite free from all fear, and will allow a person or dog to come within a few yards of them before taking wing.

Like the wood-pigeon in the breeding season, the mistletoe thrush loses much of its natural shyness and often makes its nest in the most frequented and exposed places, regardless of noise and persons constantly being in its immediate vicinity.

A few weeks ago I discovered a missel thrush's nest in a situation I could little have supposed, — in a low tree which grows within about ten yards of a stable-door, exactly facing it: this stable adjoins the house, and is only vacant during the months of June, July, and August; and in the other months, when occupied, not a day passes but the servants enter in or come out of the stable at least fifteen to twenty times; every morning the horses are taken to exercise, and pass within a few yards of the tree; besides this, there is a path constantly used immediately beneath the nest. The tree itself is an old Spanish chestnut, growing in the shape almost of the letter Z, but whose topmost branch is not ten feet high from the ground: it has not a single leaf out, and there are but two or three lateral branches forking off from its zigzag trunk: in one of these forked branches; and within reach of a man's hand without one single twig, leaf, or other means of concealment, but the forked nature of the tree, a mistletoe thrush has built her nest, and fearlessly endures the constant passing and repassing of the servants and others to the stable, and along the path; when, however, any one comes quite close, the hen bird will often quietly slip off her nest, and perches in a neighbouring tree, and this first caused me to discover her nest. In addition to other intruders upon her maternal cares are several dogs loose about, which often pass close to the tree; but there is still another object of annoyance,—itself innocent of the dread its appearance occasions the poor bird, and that is the stable kitten. No sooner is the door of the stable opened, wherein Kit is generally fastened in the daytime by a string, purposely to prevent its getting out and wandering amongst the game and young birds which are close about the house, than little puss, like some juvenile midshipman, irresistibly fond of climbing, takes a freak to run up the trunks of the surrounding trees, first frolicking up one side and down the other chasing her own tail, and shewing infinite delight in scouring up the trees, and scampering from one to the other and back again. The rough outside of the chestnut-tree, in which the nest is, and being without any side branches, renders this tree in particular of great temptation to puss, and she runs up it, to within a few feet of the nest, little thinking what is above; she seldom venturing higher than the first or second branch, and when

seen and chided for being out, instantly bounds off to the stable, to associate with, and seek protection from, an ancient crony in the character of a staid and demure Scotch terrier, an inseparable and submissive companion of Mistress Puss's. But these aerial excursions up the trees put the whole feathered tribe in the utmost commotion, and the scream or shriek of the poor mistletoe thrush as she glides away from her ill concealed nest,—the chink-chink of the frightened chaffinch,—and the chattering of the little angry jenny-wren, show something is sadly the matter amongst them. Yet the mistletoe thrush has hitherto sat through all disturbances, and I have no doubt, if she has not already, will very shortly hatch her eggs: but then will come her most anxious time, for her young ones' lowly cradle is unfortunately under the very eyes of Madam Puss, and how to lure away in safety her little brood into the surrounding bushes without encountering an untimely visit, either up the tree or on the ground, from Grimalkin, must be a sore question of daily contemplation and annoyance to the poor mother-bird, as she sits patiently fulfilling her lone but fondly endured maternal duty, and yet, with fifty other places out of which to choose a safe retreat to build her nest in and rear her young, she has chosen this one alone, of especial danger and constant solicitude; a contradiction in the usual course of nature which man daily either follows, or sets the example to.—*W. H. S. ; Hatton Hall, April 14th, 1847.*

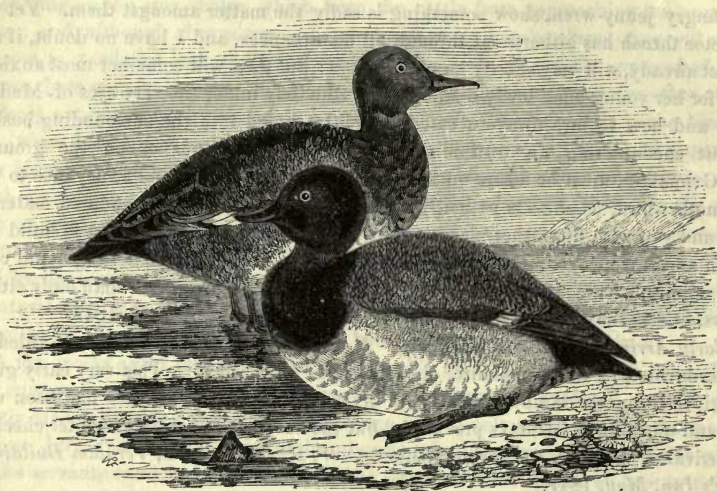
Early Arrival of the Sand-Martin.—A sand-martin (*H. riparia*) was killed at Kidderminster, in Worcestershire, on the 24th of March last. This very early guest was given to me the same day, and is in my collection. The weather had been very mild and warm for a few days previously, but the subsequent return of winter checked the arrival of many of our spring visitors. — *W. F. W. Bird ; 5, Verulam Buildings, Gray's Inn, May, 1847.*

Capture of the Bohemian Waxwing in Bedfordshire.—On the 23rd of January last, a very beautiful male Bohemian waxwing (*Bombycilla garrula*) was shot at Luton, in Bedfordshire. He was an adult bird, and in very good plumage. The weather was at that time very severe, and the ground covered with snow. When first seen, he was feeding on the berries of a mountain ash, in a garden close adjoining the street, and though a crowd of boys gathered round, he evinced no fear or shyness, and did not move till he had been pelted with stones. He then flew to a neighbouring laburnum-tree, where he was killed. He was shown to me the next day, and has been preserved by Mr. Cooper, of Radnor-street, St. Luke's, in whose possession he remains.—*Id.*

Capture of the Little Crake in Norfolk.—A very fine adult male specimen of the little crake, or olivaceous gallinule (*Crex pusilla*) was killed on the 30th of March last on the rands, or wet marshes, adjoining the large sheet of water at Heigham, in Norfolk, and is now in my collection. I need hardly tell your readers that this bird is very rare in Britain. My specimen corresponds very nearly with Mr. Yarrell's description.—*Id.*

Occurrence of the Purple Heron near Lydd.—A splendid specimen of the African or purple heron (*Ardea purpurea*) in the most perfect plumage, was shot at Lydd, in Romney Marsh, March 29th, and is now in my possession: I obtained a young bird from the same locality, in September, 1838.—*F. Plomley ; Maidstone, Kent, April 17th, 1847.*

Description of and Notes respecting Paget's Pochard ('Fuligula ferinoides,') a New species of the Duck Tribe. By WILLIAM R. FISHER, Esq., F.L.S.



Paget's Pochard. Adult and immature males.

In the month of August, 1845, I communicated to the 'Zoologist' (Zool. 1137) a notice of the occurrence on Rollesby broad, near Great Yarmouth, in February of that year, of a bird of this tribe which was in the possession of my friend Mr. Gurney. Not being at that time aware of the existence of any similar specimen, and finding that the bird possessed several characters which belong to the common pochard (*F. ferina*) and to the white-eyed pochard (*F. nyroca*), I supposed that it might be the result of an accidental cross between those two species; and I accordingly described it as such, and the description, together with an engraving of the bird, and outlines representing its tracheal enlargement and those of the two other species to which I have alluded, was inserted in the Account of Norfolk Birds (Zool. 1379).

A few days ago Mr. Bartlett, of Little Russell Street, purchased in a London Market, a duck, which he had perceived to be similar to the above-mentioned bird; and having shortly afterwards shown me his specimen, without in any manner stating his impression upon the subject, I immediately expressed a similar opinion as to its identity. Mr. Gurney having kindly forwarded his bird for my inspection, it was

found upon comparison that the two examples agreed both in anatomy and external colour and dimensions.

A third example, obtained some years ago in the London market by Mr. Henry Doubleday (who has also been good enough to allow me the use of it), and which had previously been supposed to be a specimen of the bird known as the American scaup*—although from being an older, and probably an adult bird, it somewhat differs in plumage,—is evidently identical with the others.

The three birds which I have mentioned were exhibited by Mr. Bartlett on the 13th inst. at the evening meeting of the Zoological Society, and were satisfactorily shown, by comparison with a long series of examples selected from this group of ducks, to belong to a new, and hitherto, undescribed species.

In order to mark the affinity of this bird to our common pochard (*Fuligula ferina*), the scientific name *ferinoides* has been adopted for it by Mr. Bartlett; and the name of 'Paget's pochard' has been also given it, after my late friend C. J. Paget, Esq., of Great Yarmouth (near which place the first authenticated British specimen was obtained), a zealous and accomplished naturalist, and one of the authors of a useful work on the Natural History of Great Yarmouth and its neighbourhood.

The specimen of this bird which I have mentioned to be in the possession of Mr. H. Doubleday, and which is represented in the foreground of the cut at the head of this paper, is supposed to be in the adult dress, and has the bill black at the point and at the base, the remaining portion being pale blue; the irides yellowish-white; the head and upper part of the neck of a rich and very deep chestnut, finely glossed with purple; the lower part of the neck and breast black; in the younger birds the neck almost wants the purple gloss, and is of a lighter colour, the breast being also at first not much darker than the neck; the back and wing-coverts are minutely freckled with grayish-white on a black ground; the sides and flanks, both under and below the wing, are in the immature bird like the back, but in the adult are lighter, the freckling being produced, as in the back of the common pochard, by lines of *black* on a *white* ground; the back and wing-coverts are also darker in the immature than in the adult bird, and are tinged with yellowish-brown; wing-coverts very dark-brown, slightly

* It is described and figured in Yarrell's 'British Birds,' under the name of American scaup (*Fuligula mariloides*, Vigors). Vol. iii. p. 247 of the first edition.—*E. N.*

powdered with grayish-white ; the primaries light-brown, broadly edged with dark-brown, except the first, which has the whole of the outer and great part of the inner web dark-brown ; all the visible part of the secondaries white, slightly powdered with gray, and forming a white bar across the wing ; about a quarter of an inch near the ends of these feathers is black, and the tips are white in the immature bird, but in the adult the white is hardly visible ; at both ages the uppermost feathers of the speculum are of a more uniform gray than the lower, and more or less edged with black ; the rump and upper tail-coverts black, this colour being spread over a much greater extent in the adult than in the immature bird ; on the chin is a small triangular spot of yellowish-white ; the lower part of the breast and belly, in the immature specimen, yellowish-brown mixed with light gray, and slightly freckled with black ; the yellow colour giving place to the gray, and the part becoming darker as the bird attains maturity ; the feathers about the vent are in the immature birds white at the sides, and freckled with dark gray in the centre, the youngest bird also exhibiting in this part a good deal of yellowish-brown ; in the adult entirely of dark gray ; the legs and toes dark bluish-gray, the webs and claws black.

The total length of Mr. Bartlett's bird (of which a figure appears in the background of the cut) was before preservation $17\frac{1}{2}$ inches ; from the carpal-joint to the end of the wing $7\frac{3}{4}$ inches ; the beak from the middle of the forehead $1\frac{3}{4}$ inches ; the middle toe with the claw $2\frac{1}{2}$ inches.

This species may be distinguished from *F. ferina* externally, by its smaller size ; the much smaller space occupied by the black colour at the base of the bill ; the yellowish colour of the irides ; the greater extent of the dark colour on the breast, which reaches further both upwards and downwards, than in the common species, and is, I think, at no age in such strong contrast with the colour of the neck and head ; and by the purple tint and finer texture of the neck and breast-feathers ; by the white bar on the wing, and by the much darker tint of the freckled parts.

Internally, the eye, when removed from the head, was, in Mr. Gurney's bird, found to be considerably larger than that of *F. ferina* ; the trachea (of which an engraving, showing both sides of the bony enlargement appears in the next page*) differs materially from that of the

* It should be observed here, that the trachea has been represented in a curved position, only because the size of the page would not admit of its being introduced entire in any other form.

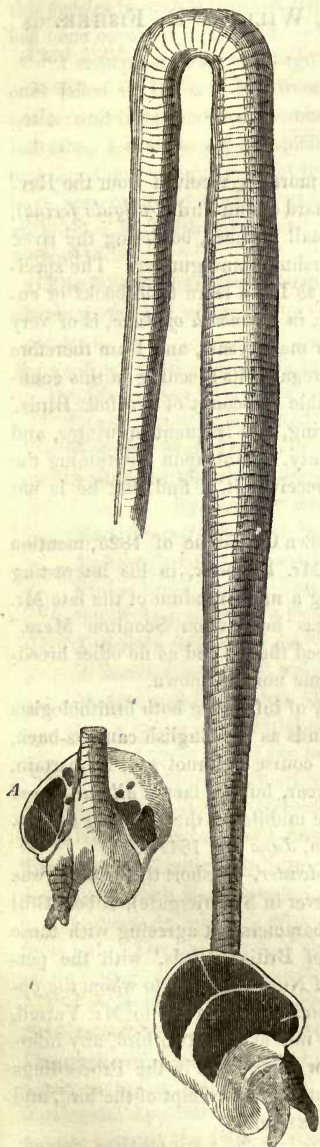
latter bird, which at no great distance from its lower extremity becomes of an uniform size; and the form of the enlargement itself bears a much closer resemblance, on the side which in the figure is marked *A*, to that of the canvas-backed duck of America (*F. valisneria*) than

to that of our common species, but is of course much smaller than either; lastly, the emarginations in the sternum of the new bird are, notwithstanding the much smaller size of the whole bone, fully as large as those in the sternum of the common pochard.

The female of Paget's pochard has not as yet been recognised; but it is anticipated that, although strongly resembling that of *F. ferina*, it will be found to possess the white speculum by which the male is distinguished; and it is hoped that the descriptions here given will lead to the identification of other examples of this interesting species.

Having alluded, at the commencement of this paper, to the fact that the first specimen of this species which was obtained was considered to be a hybrid between the common and white-eyed pochards, I may here, without reference to the question to what extent intermixture takes place amongst animals in a perfectly wild state, observe, that several of the internal characters, which upon more careful examination have become apparent in the bird under consideration, are such as could hardly by any possibility have resulted from a cross between those two species.

Mr. Gurney's specimen, which, as far as I am aware, is the only one which has been noticed in a wild state,



Trachea of Paget's Pochard.

was killed amongst some widgeon, and was observed to be much tamer than those birds, and to swim very deep in the water; which I regret to add, is all the information that I am at present able to give respecting the habits of this pochard.

WILLIAM R. FISHER.

5, Verulam Buildings, Gray's Inn,
April 20th, 1847.

The Pochard breeding in Norfolk.—I have this morning received from the Rev. T. C. Haddon, Incumbent of Tunstall, Norfolk, a pochard or dun-bird (*Fuligula ferina*), which he informs me was killed yesterday on Tunstall marshes, bordering the river Bure, by Mr. Christmas Francis, an experienced marshman and gunner. The specimen is a male, in his second or third year. As far as I can learn from books or enquiry, the fact of a pochard being killed in England, *in the month of June*, is of very rare occurrence; at all events it has not happened for many years, and I am therefore anxious to give it publicity through your pages. As regards its breeding in this country, Messrs. Gurney and Fisher, in their very valuable 'Account of Norfolk Birds,' state that the pochard is common in autumn and spring, and frequent in winter, and "has been occasionally known to breed in the county." But upon mentioning the matter to Mr. Fisher, who saw my bird soon after I received it, I find that he is not aware of any such breeding for many years past.

Messrs. Whitear and Shepherd, in their well known Catalogue of 1825, mention that "the pochard breeds at Scoulton Mere." But Mr. Lubbock, in his interesting 'Observations on the Fauna of Norfolk,' after quoting a memorandum of the late Mr. Girdlestone, who "was informed that this duck has bred upon Scoulton Mere," expressly tells us, that the pochard has ceased to breed there; and as no other breeding-place has been suggested in that county, I presume none is known.

I am therefore most happy to have the opportunity of informing both ornithologists and sportsmen, that this duck, considered by gourmands as the English canvass-back, has again appeared as a summer resident here. Of course I cannot say, for certain, that the pochard has bred or paired in Norfolk this year, but the fact is *all but proved* by the occurrence there of an adult male bird in the middle of the breeding season.—*W. F. W. Bird*; 5, Verulam Buildings, Gray's Inn, June 4th, 1847.

Occurrence of a Specimen of Larus Rossii near Tadcaster.—A short time since I was shewn by Mr. Graham (the very excellent bird-preserved in Spurriergate), a beautiful gull which had been shot near Tadcaster; and its characters not agreeing with those of any species appearing in Mr. Yarrell's 'History of British Birds,' with the permission of its owner, and of William Milner, Esq., of Nun Appleton, to whom the opportunity of purchasing the specimen had been promised, I sent it to Mr. Yarrell, stating at the same time, that if the gull were new or rare as a British bird, any information on the subject would be highly acceptable for publication in the Proceedings of this Society. From Mr. Yarrell's acknowledgment* of the receipt of the bird, and obliging reply to my inquiries, I make the following extract:—

* Dated Ryder-street, St. James's, March 23rd, 1847.

"The sight of the gull enables me to send you so many references to this species that any remarks from me will be superfluous, beyond noticing that, as far as I am aware, it is not only a very rare bird, but also quite new to our British Catalogue. This last remark may require explanation, because Mr. William Macgillivray includes this species in his 'Manual of British Ornithology,' with the remark that "this species has once occurred in Ireland."—Vol. ii. p. 254.

"I remember some years ago to have seen a notice in print, that this bird had been once taken in Ireland, but from the countries visited or known to the writer of that notice, and from the circumstance that this species had only occurred in high northern latitudes, I came to the conclusion that the printer had made a mistake of *one* letter, and that for *Ireland*, we ought to read *Iceland*. Add to this, that the birds of Ireland have been carefully worked out by Mr. Thompson, of Belfast, who is one of the best authorities for Irish birds, and this species is not included by him in his 'Fauna of Ireland.'"

The following are the references to this species, which Mr. Yarrell is so good as to supply at the end of his letter.

Larus Rossii.

Ross's Rosy Gull—Cuneate-tailed Gull—Wedge-tailed Gull, &c., first noticed by Dr. Richardson in a paper read by the Wernerian Society, in January, 1824.

Fauna Boreali-Americana, Swains. and Rich., 1831 ... page 427. sp. 192.

Nuttall's Man. Ornith. of U. S. and Canada, 1834 ... page 295 and 296.

Audubon's Ornith. Biog. 1839 vol. 5. page 324.

„ Synopsis of Birds of N. A. 1839 page 323. sp. 442.

Macgillivray's Man. of Brit. Ornith. 1842. vol. 2. page 252.

Audubon's Birds of America vol 7. page 296.

Richardson's App. to Parry's Second Voyage page 359.

Ross's App. to Parry's Polar Voyage page 195.

Appendix to Ross's Last Voyage, 1835 page 36. sp. 26.

Wilson's Illust. Zool. vol i. pl. 8.

Jardine and Selby Orn. Illust. p. 1. plate 14.

See also Gray and Mitchell's Genera of Birds, part 19, Nov. 1845, for a figure on plate 180 of the head and form of the tail.

The Fauna Boreali-Americana, not being accessible to me, I consulted Audubon's American Ornithological Biography, of which there is a copy in the library of the Society. Under the head of *Larus Rossii*, Audubon remarks that he has never met with "this beautiful little gull," and that he is consequently obliged to quote the following description from Dr. Richardson's work:—

"Cuneate-tailed gull, with a pearl-gray mantle. Wings longer than the cuneiform tail. The outer web of the first tail-feather blackish; a slender black bill, tarsi an inch long, and, as well as the feet, vermillion red.

"Two specimens of this gull were killed on the coast of Melville Peninsula, on Sir Edward Parry's second voyage, one of which is preserved in the Museum of the University of Edinburgh, and the other was presented to Joseph Sabine, Esq. No other examples are known to exist in collections; but Commander Ross, in his Zoological Appendix to Sir Edward Parry's narrative of his most adventurous boat-voyage towards the Pole, relates that several were seen during the journey over the ice north of Spitzbergen, and that Lieutenant Forster also found the species in Waygait Straits, which is probably one of its breeding-places. It is to Commander Ross, who

killed the first specimen which was obtained, that the species is dedicated, as a tribute for his unwearied exertions in the promotion of natural history on the late Arctic voyages, in all of which he bore a part. Of the peculiar habits or winter retreat of this species nothing is known.

"Description of a specimen killed, June, 1823, at Alagnak, Melville Peninsula. Lat. $69\frac{1}{2}$ deg. N.

"Colour.—Scapulars, inter-scapulars, and both surfaces of the wings, clear pearl gray; outer web of the first quill blackish-brown to its tip, which is gray; tips of the scapulars and lesser quills whitish. Some small feathers near the eye, and a collar round the middle of the neck, pitch black. Rest of the plumage white, the neck above and the whole under plumage deeply tinged with peach-blossom-red in recent specimens. Bill black; its rictus and the edges of the eyelids reddish-orange. Legs and feet vermillion-red; nails blackish.

"Form.—Bill slender, weak, with a scarcely perceptible salient angle beneath; the upper mandible slightly arched and compressed towards the point; the commissure slightly curved at the tip. Wings an inch longer than the decidedly cuneiform tail, of which the central feathers are an inch longer than the lateral. Tarsi rather stout; the thumb very distinct, armed with a nail as large as that of the outer toe.

"The other specimen, killed by Mr. Sherer a few days later, differs only in the first primary coverts having the same dark colour with the outer web of the first primary itself."

It would appear that the fate of the specimen of *Larus Rossii*, given to Mr. Sabine, is not known, and that none of our public museums have since been able to obtain examples; for Mr. Mitchell, the Secretary of the Zoological Society, and joint-author with Mr. G. R. Gray, of the beautiful work now publishing on the genera of birds, in writing to me upon the subject, remarks, "The only specimen I could hear of when I wanted it [*Larus Rossii*] for the 'Genera of Birds' was one at Edinburgh, from which I obtained a drawing."

Being anxious to know upon what evidence Professor Macgillivray had inserted *Larus Rossii* in his 'Manual of British Ornithology,' I wrote to this gentleman for information upon the point, but at present no reply to my inquiry has reached me. Messrs. Gray and Mitchell adopt for this species the subgeneric name *Rhodostethia*, with the following characters:—

RHODOSTETHIA, Macgillivray.

"Bill short, slender, straight, with the culmen straight at the base, and curved at the tip, the sides compressed, the gonys short, advancing upwards, and scarcely angulated; the nostrils lateral and submedial. Wings lengthened and pointed, with the first quill the longest. Tail moderate and wedge-shaped. Tarsi strong, as long as the middle toe. Toes moderate, the anterior ones united by a full web; the hind toe short and elevated."

Mr. Yarrell, in a subsequent letter, put me in possession of the following notes which he had taken of the winter plumage, &c., of this specimen:*

* Its capture is authenticated in the following memorandum, received from Henry Milner, Esq. (Nun Appleton):—"Ross's gull was killed by Horner, Lord

"Beak black; eyes with a narrow line of dark feathers around them; head, whole of the neck and breast delicate rose colour, mixed or clouded with French gray; wings and back French gray; outer web of the first primary only, dark gray; the shafts bluish-gray; upper tail-coverts, tail-feathers, and all the under surface of the body, delicate rose-colour; under surface of the wings French gray; the shafts of the primaries white; central pair of tail-feathers the longest; the remainder graduated, forming a wedge-shaped tail; legs, toes, and interdigital membranes, vermillion; the claws black. Whole length of the bird about 14 inches; wing, from the anterior bird to the end of the first primary, which is the longest, $10\frac{1}{2}$; beak, from the point to the feathers on the top, three-fourths of an inch; length of the tarsus, $1\frac{1}{4}$."—*Edward Charlesworth in Proceedings of Yorkshire Philosophical Society.*

Notice of Ornithological Occurrences in Norfolk, for May, 1847.—We have this month to notice the occurrence of two examples of the spoonbill; the first, a very fine adult male, was killed on the river Bure, near Yarmouth, on the 2nd instant; the other, also a male, but in immature plumage, was shot on the 19th at Salthouse.

On the 7th, a pair of black-tailed godwits (male and female), having partially assumed the summer plumage, also occurred at the latter place.

A fine adult male golden oriole was shot on the 8th instant in the garden of a public-house at Heigham, on the outskirts of the city of Norwich. It was in poor condition. A bird supposed to have been a female of this species was seen in the same place on the following day, but was not obtained.

Temminck's stint was taken at Yarmouth on the 14th, and about the same time the following incident occurred. Some men who were employed in felling oak-trees at Easton, on proceeding to bark one of the trees which had been just cut down, found, fixed to one of the principal branches, the nest of a pair of long-tailed titmice, containing a brood of young ones, which appeared quite uninjured by the fall which they had sustained. The branch having been cut off was fixed, with the nest still attached to it, to the trunk of an adjoining tree, at about its original height from the ground; soon after which, the old birds recommenced feeding their young, and continued to do so, as if no disturbance had taken place. The latter have since flown.

About the 17th of the month, a nest, containing four eggs, which from their appearance, and the description which was given of the old birds, are probably those of the widgeon, was taken on the edge of the river Bure. The eggs have been placed under a bantam, and we hope to be able to announce the result in a future communication.

On the 19th a male osprey was trapped at Westwick; the feathers on the back of this specimen are without the white tips which are usually observable.

About the middle of the month some dotterel (*C. morinellus*) and whimbrels and turnstones, rapidly assuming their summer garb, may be noted as passing northwards; and some examples of the gray plover, which had been obtained from Breydon at about the same time, had nearly obtained the black colour peculiar to the breeding season.

Later in the month foolish guillemots and razorbills have been frequent upon the coast.—*J. H. Gurney, William R. Fisher; May, 1847.*

Howden's head keeper, in February last (1847), in a ploughed field, near the hamlet of Milford-cum-Kirby, in the parish of Kirby: its flight resembled, according to Horner's account, the flight of any other gull, and it did not seem at all shy."

Note on the Arrival of the Summer Birds of Passage in Roxburghshire, in the years 1846 and 1847.

	1846.	1847.
Pied wagtail	About the middle of March.	March 25th
Gray wagtail	Do.	March 21st
Starling	April 13th	March 25th
Titlark.....	April 6th	April 11th
Reed bunting.....	April 9th	March 22nd
Sandpiper	April 11th	April 22nd
Willow wren	April 19th	April 29th
Sand martin	April 20th	May 5th
Tree pipit	April 26th	May 6th
Swallow	April 29th	May 5th
Cuckow	April 30th	May 7th
Blackcap.....	May 1st	May 9th
House martin.....	May 6th	May 5th
Whitethroat	Do.	May 10th
Wood-wren.....	Do.	May 11th
Swift	May 9th	May 8th
Redstart.....	May 10th	May 12th
Cornerake	May 11th	May 7th
Whinchat.....		May 12th
Flycatcher		May 20th
Garden-warbler		May 21st

—Archibald Jerdon ; *Lintalee, Jedburgh, May 27th, 1847.*

Description of a remarkable Species or Variety of British Paludina.—Having met with a variety, or species, of British Paludina not described in Gray's edition of 'Turton's Manual,' and, as far as I can learn, unknown to conchologists generally, the following description thereof may prove interesting. The shell is perfectly *beardless*, both externally and internally, in all stages of growth ; it has five and a half volutions in the adult state ; the colour is a bluish-green when alive with the animal in it, changing to yellowish-green after the animal has been removed, and the moisture of the periostraca thoroughly dried up ; inside light bluish-white, and the lip edged with dark brown, forming a very pretty contrast with the light colour of the shell : in general outline of form it approaches nearest to *Paludina achatina*, but is thinner, and rather shorter in proportion to the breadth than the generality of specimens of that species. I have not as yet been able to discover any decided difference in the animal of that and the banded Pal. *achatina*, except that the foot appears darker coloured, and does not protrude so far from beneath the shell when the animal is progressing. This shell is very local, and by no means plentiful, at which I am rather surprised, as in the oviduct of one individual I found fifty young ones in different stages of development, and in that of the banded shell, which is abundant, not more than seventy. I have taken

it in slow streams in Hertfordshire for the last three years successively, but nowhere else, and have never met with any specimens in the same locality that are intermediate between it and the strongly banded *Pal. achatina*, but, on the contrary, all the other specimens I have taken in that neighbourhood, and associated with it, are the most strongly banded I have ever seen.

I have a series of *Pal. achatina*, taken in the neighbourhood of Newbury, Berks, varying from strongly banded to very faint, also from other localities, but, however pale or faint, yet the bands are distinctly visible both inside and out on holding the specimens to the light: this is not the case with the shell under consideration, as in all the specimens I have taken, varying in size from one-eighth, to one inch and a quarter, not a vestige of banding is discernible. As this shell is so very distinct in appearance from the two described species of British *Paludina*, viz., *Pal. vivipara* and *Pal. achatina*, both of which have hitherto been described, figured, and regarded as *banded* shells, I propose, until decided whether it be a distinct species or not, naming it *Paludina achatina*, var. *efasciata*, which name can stand as specific, should it hereafter prove to be a species.—*John Pickering*; 117, *Lower Thames Street*, May 17, 1847.

Captures of Lepidoptera.—The following are some of my principal captures of *Lepidoptera* during last year, with dates and localities.

Thecla Betule. Collier's Wood, Greenhithe, September, worn.

Acherontia Atropos. Hammersmith, larvæ, July; bred, September.

Egeria Cynipiformis. Oaks, Hyde Park, June and July.

Triphana subsequa. Sherwood Forest, July 31, one, sugar.

Agrotis saucia. Hammersmith, garden, October, one, sugar, very fine, never captured here before.

Agrotis agathina. Weybridge, August, sugar and on heath, rare.

Graphiphora rhomboidea. Wood near Chesterfield, July, sugar.

Orthosia populeti. Wimbledon Park, one, sallows, March.

Orthosia mynda. Wimbledon Park, twelve, sallows, March.

Segetia neglecta. Weybridge, August, sugar and on heath, rather plentiful.

Caradrina glareosa. Weybridge, August, four.

Calocampa vetusta. Wimbledon Park, one, sallows, March.

Xylophasia scolopacina. Chesterfield, Worksop, and Sherwood Forest, July, sugar.

Mamestra nigricans. Banks of the Thames below Gravesend, larvæ, June; imago, July.

Apamea connexa. Wood near Chesterfield, July, sugar.

Apamea congener. Doncaster, Worksop, and Sherwood Forest, July, sugar.

Apamea ophiogramma. Hammersmith Marshes, one, July, sugar.

Polia tineta. Birch Wood, larvæ feeding on birch, April; bred, June.

Polia occulta. Weybridge, August, one, sugar, wasted.

Acronycta ligustri. Darenth Wood, end of May, sugar.

Ceropacha fluctuosa. Darenth Wood, May, one, flying at dusk.

Ceropacha Or. Darenth Wood, sugar.

Tethea subtusula. Hammersmith Marshes, July, one, sugar.

Cosmia fulvago. Worksop, July, one; Sherwood Forest, July, six, sugar.

- Xanthia aurago*. Darenth Wood, September, one, sugar.
- Hipparchus Papilionarius*. Birch Wood, larvæ feeding on birch, April; bred, June.
- Alcis Abietaria (sericearia)*. Black Park, July, three, by beating fir trees.
- Alcis consortaria*. Darenth Wood, end of May, flying and at sugar.
- Tephrosia extersaria*. Darenth Wood, end of May.
- Tephrosia tetragonaria*. Birch Wood, April, one.
- Cidaria olivaria*. Chatsworth Park, July, four.
- Pachycnemis Hippocastinaria*. Weybridge, May, July and August, flying over heath.
- Chesias obliquaria*. Dartford Fence, one, April; Weybridge, two, early in May.
- Eupithecia simpliciatæ*. Banks of Thames below Gravesend, July.
- Eupithecia togata*. Black Park, June, by beating firs.
- Eupithecia venosata*. Darenth, one, May.
- Eupithecia coronata*. Dartford Fence, April.
- Cledeobia costæstrigalis*. Black Park, June, flying over heath.
- Cledeobia albistrigalis*. Darenth Wood, September, sugar.
- Margaritia sticticalis*. Sherwood Forest, one, July.
- Carpocapsa maritima*. Banks of Thames below Gravesend, July.
- Cochylis affinitana*, Doug. Banks of Thames below Gravesend, July.
- Anacampsis Mouffetella*. Dartford Fence, June.
- Anacampsis aspera*. Dartford Fence, June.
- Anacampsis variella*, Doug. Banks of Thames below Gravesend, July.
- Anacampsis Pinetella*? Dartford Fence, June.
- Phycita Abietella*. Weybridge, August.
- Phycita nivella*. Charlton, July.
- Crambus Silacellus*. Banks of Thames below Gravesend, July.
- Theristis nemorella*. Black Park. July.
- Tinea semifulvella*. Dartford Fence, June.
- Tinea ustella*. Dartford Fence, June.
- Tinea parasitella*. Old oaks, Hyde Park, June and July.—*Samuel Stevens*; 38, King Street, Covent Garden, November 16, 1846.

Captures of Lepidoptera and Enquiries respecting certain Species.

Colias Edusa and Hyale. I did not see a living specimen of either of these species last year, nor have I heard of their capture near London.

Psyche fusca. Was taken in some of the woods about Hornsey last year, by the "practical entomologists."

Chersotis agathina, Boisduval, *Lytea albimacula*, Stephens. I took seven on the flowers of the ling (*Calluna vulgaris*), at Wickham, in August, and others have been taken at Weybridge, &c. Boisduval places this moth in his genus *Chersotis*, next to *Porphyrea*, and Guénée makes it an *Agrotis*, and puts it next to *Tritici*. It is certainly related to both these species.

Agrotis lunigera. A few specimens of this distinct species were taken many years ago near Cork, but I never heard of its capture since. Do any readers of the 'Zoologist' know of an instance?

Segetia neglecta. Has occurred at Wickham and several other places, in August last, on flowers of ling.

Acronycta Salicis, Curtis. Is this distinct from *A. rumicis*? I see no difference except the darker colour.

Cabera rotundaria. Some of my correspondents think that this and *pusaria* are synonymous, but they are certainly quite distinct, *rotundaria* having the upper wings more rounded, and the lines across them nearly confluent in the centre.

Genus *Peronea*. Last season the *Peroneæ* were very abundant. Some thousands were taken at Hainault and Whittlebury Forests; among them several that some persons think are distinct species. I believe, however, that they are only new *varieties*, and that we have really but one exceedingly variable species of "raised buttons." Those *Peroneæ* without the "button," taken in Scotland by Mr. Weaver, will, I think, be resolved into three or four species, though the varieties seem endless.

Anacamptis nebulea. This species, I see, is often confounded with *Malvella*, but it is very distinct both in its markings and habits. It is most nearly allied to *betulea*, but it may be easily distinguished by a light-coloured spot near the extremity of the costa. Sometimes there is another spot on the inferior edge immediately under this, but it is not constant. The moth is very well figured in Wood's Index. I have taken it only on Jerry's Hill, Putney Heath, on a bare place, where it gets up from among the dry gravel and flies about at dusk, in April and May.—*J. W. Douglas*; 19, *Nelson Square, Peckham, May 5, 1847*.

Captures of Lepidoptera.—As I observe the kindness with which you admit into your columns all information connected with the immediate subjects of your magazine, I am induced to send you a short minute of a few of the captures I made last August, during an entomological excursion to Brockenhurst (New Forest), to Weybridge, and to Greenhithe.

Brockenhurst, August 27th to 30th.

Polia occulta. At sugar.

Stilbia anomolata. At rest on the seed-stalks of grass, on Brockenhurst Common (only three females out of seventeen specimens).

Segetia neglecta. On heath bloom and at sugar.

Caradrina glareosa. On heath bloom.

Peronea insularia. By beating. The other more common *Peroneæ* I was too early for.

Sarothripus degeneranus. By beating.

Leptogramma literana, *squamana*, *tricolorana* and *fulvomistana*.

Weybridge, August 31st and September 3rd.

Agrotis agathina. Five, on the heath and at sugar.

Segetia neglecta. At sugar. These specimens were not so large and fine as those taken at the New Forest.

Caradrina glareosa. At sugar.

Pachynemina Hippocastinaria. Flying over the heath in the evening.

Crambus hamellus and *latistrius*. Beat out of the heath.

Greenhithe, Darenth Wood, September 8th to 21st.

Charæa fusca. Nine, at sugar.

Xylina semibrunnea. At sugar.

Calocampa vetusta. At sugar.

Orthosia lunosa. Thirty-eight, on ivy bloom and at sugar.

Orthosia litura. On ivy bloom and at sugar.

Xanthia Aurago and *Croceago*. On ivy bloom and at sugar.

Cledeobia albistrigalis. On ivy bloom and at sugar.

I have purposely omitted from the foregoing list a number of other captures of the autumnal moths which are taken in most localities. Some of them swarmed on the sugar, notwithstanding the dry weather and north-easterly wind which prevailed most of the time.

Agrotis saucia and *Polia occulta* were taken by an entomological friend in an orchard within a hundred yards of my residence.

The occurrence of so many of the rarer of our Lepidopterous insects in tolerable numbers will long mark the past year as the most prolific for the entomologist we have had for a long time.—*Fredk. Grant*; 15, *Sussex Place, Kensington New Town*.

Captures of Lepidoptera at Lewisham in 1846.

Polia dysodea. One, July 3, attracted by light.

Cnephasia longana. One, July 3, attracted by light.

Chætöchilus sequellus. One, July 7, on palings.

Anacamptis Mouffetella. One, July 11, on palings.

Dipterygia Pinastri. One, July 11, at sugar.

Mythimna grisea. One, July 11, one, July 20, at sugar.

Caradrina blanda. Common, at sugar, July 13—27.

Miana literosa. Fourteen, at sugar, July 14—31.

Lophonotus fasciculellus. One, July 19, at sugar.

Lozotania Grotiana. Two, July 19, at sugar.

Anacamptis maculella. Nineteen, at sugar, July 20—August 4.

Triphæna interjecta. Common, at sugar, July 20—August 21.

Depressaria characterosa. Five, July 20—August 31.

Depressaria damella. Twelve, July 22—September 2.

Hypsolopha antennella. One, July 22, one, July 28, at sugar.

Anacamptis tricolorella. Four, July 21—30, at sugar.

Eupithecia subfulvata. One, July 23, attracted by light.

Ptilodontis palpina. One, July 25, attracted by light.

Cosmia affinis. Four, July 28—29, at sugar.

Cosmia diffinis. Nine, July 29—August 21, at sugar.

Pyralis glaucinalis. Common, July 28—August 31, at sugar.

Lobophora sexalisata. One, July 30, at sugar.

Agrotis puta. Plentiful, July 29—August 21, at sugar.

Agrotis suffusa. Plentiful, August 7—September 10, at sugar.

Electra testata. One, July 31, one, August 31, at sugar.

Pseudotomia compositella. Three, August 4, flying in a clover-field.

Apamea nictitans. Four, August 4—7, at sugar.

Lytea umbrosa. Six, August 7—24, at sugar.

Apheloseia marginea. One, August 10, one, August 16, at sugar.

Triphæna fimbria. One, August 13, at sugar.

Graphiphora C-nigrum. Common, August 13—September 10, at sugar.

Agrotis saucia. One, August 16, at sugar.

Anacamptis interruptella. One, August 16, at sugar.

Eupithecia antirrhinana. One, August 17, one, August 23, at sugar.
Catocala nupta. Four, August 19—22, at sugar.
Cerigo texta. One, August 21, at sugar.
Polia occulta, ♂. One, August 28, at sugar.
Cosmia fulvago. One, August 29, at sugar.
Hadena thalassina. One, August 31, one, September 1, at sugar.
Xanthia citrigo. One, September 1, at sugar.
Orthosia lunosa. One, September 3, at sugar.
Argyromiges trifasciella. One, September 7, at sugar.—*H. T. Stainton*; *Lewisham*, September 11, 1846.

Captures of Lepidoptera at Pashley, near Ticehurst, in Sussex, September 4 to 6, 1846.

Sphinx Convolvuli. Fourteen, flying over Petunia beds.
Ceropacha diluta. Twenty-two, at sugar.
Triphæna fimbria. One, at sugar.
Segetia neglecta. Seven, at sugar.
Agrotis agathina. Four, at sugar.
Margaritia ferrugalis. One, flying among heather.
Antithesia oblongana. One, flying in a clover-field.
Gracillaria substriga. One, beat out of bushes.
Peronea trigonana. Two, beat out of bushes.

Captures of Lepidoptera at Charlton.

Eupæcilia dubitana. Two, August 12.
Anacamptis quadripuncta. One, August 12.
Anacamptis interruptella. Five, August 12.
Pterophorus trigonodactylus. Two, August 12.
Anacamptis interruptella. One, August 22.

Captures of Lepidoptera at Wickham, August 25.

Pseudotomia Ehippana. Nine, beat out of hedges.
Aryyromiges corylifoliella. Two, beat out of hedges.
Spilonota stræmiaria. One, heather, flying.
Cledeobia costæstrigalis. One, heather, flying.
Graphiphora Dahlii. Two, worn, by sweeping the heather.
Segetia neglecta. One, by sweeping the heather.
Agrotis agathina. One, by sweeping the heather.—*Id.*

Capture of Vanessa Antiopa near Kingsbury, Middlesex.—I was fortunate enough to take a fine female specimen of *V. Antiopa* on Saturday the 10th instant, at the well-springs, in this parish; it was hovering over some nettles when I first saw it,—does the larva ever feed on that plant? if so, it probably was laying its eggs. The margins of the wings are very white, and the blue spots are remarkably bright; from its general appearance it had evidently hybernated in the perfect state.—*Frederick Bond*; *Kingsbury*, April 12th, 1847.

Affinities of the Stylopites, an Essay. By EDWARD NEWMAN.*Preliminary Note.*

It is not a little remarkable that no calm rational enquiry has yet been instituted into the affinities of the Stylopites. We have crude hypothetical guessings to admiration; we have moreover details of structure, which, superficial though they be, at least possess the merit of having dissipated the doubts with which the extraordinary descriptions of earlier writers had obscured the truthful anatomy of the thoracic segments: but we have no essay in which the promulged hypotheses are supported by a review of facts; we have no facts in economy and structure availed of as a basis for logical deductions. I have therefore endeavoured to embody in a more connected and complete form than has yet been published, the verified observations of entomologists, and to announce deductions which will now appear irresistible, however they may differ from prior surmises, whether of others or my own, because these have always been founded on insufficient data.

In the *first* place, I assume, as an abstract position, and totally independent of the question of affinities, that it is highly improbable, because at variance with the law of nature in other cases, that the numerically insignificant group before us, should constitute a division of the animal kingdom equal in grade to that of birds, or reptiles, or fishes, or beetles; I say improbable because we have no parallel instance; Ornithorhynchus, Echidna, Apteryx, Agaon, Hypocephalus, Trictenotoma, Forficula, Aleurodes, Pulex, Mantispa, all have their affinities, all are related, perhaps distantly, but still certainly, to some well-known, well-understood group; but the Stylopites at present have no affinities; they are regarded as constituting a class of themselves, as being an isolated group detached from the rest of the animal kingdom: such was the view of Kirby and Latreille, and such I believe is the opinion of all naturalists capable of forming one. I think that the institution of classes for the reception of species, or small groups of species, is to be traced, *first*, to an unwillingness to allow nature sufficient scope in the variety of her modifications, and *secondly* from our ignorance of kindred forms which certainly *may*, and probably *do* exist. These considerations demand that we should pause before accepting the hypothesis that the Stylopites stand alone. To me it appears certain that this isolated position must be shaken by the patient investigation of economy and structure, and the deduction of

logical inferences from positive observations. We want the knowledge of those kindred forms that may intimately connect the Stylopites with forms already known: and in the absence of that knowledge we want logical reasoning on the facts already within our reach.

In the *second* place, I assume, that certain positions are established by the very general consent of naturalists: *e.g.*, that organised beings divide into animal and vegetable: that animals are constructed on certain different plans, as vertebrate, articulate, radiate: that certain articulate animals are apterous, as Crustacea, Arachnida, Myriapoda; and certain others winged, as Lepidoptera, Diptera, Hymenoptera; that winged articulates constitute a group of themselves; that Stylops is an organized being; an animal; an articulate; a winged articulate: that at this point our knowledge of its affinities ceases, and therefore that at this point the present enquiry begins.

In the *third* place, I assume, that the just arrangement of winged articulates or insects depends on the combination of three series of functions, *viz.*, metamorphosis, nutrition, and locomotion: these have given rise to three artificial methods of arrangement called the metamorphic, maxillary, and alary, respectively promulged by Swammerdam, Fabricius, and Linneus: but I assume that no method can be natural that is not in accordance with all three series of functions, and indeed, with all series of functions that may by their variation furnish us with characters whereby to separate given divisions into minor divisions.

Division of the Subject.

In accordance with the foregoing assumptions, it becomes necessary to divide the subject into its constituent parts and to consider them *seriatim*. The three series of functions employed by entomologists in these varied methods of arrangement must be consulted, both with reference to Stylops itself and to winged insects generally; and here it must be observed, that in thus selecting three series of functions to the exclusion of others, I do so solely from necessity (all our knowledge having relation thereto), and not because I would assert the superiority of these functions over others, of which hitherto we have taken no account. Each of these series of functions having then to be considered twice, *i. e.*, positively and comparatively, we arrive at a division of the subject into six sections.—1. Economy and Metamorphosis of Stylops. 2. Comparative Economy and Metamorphosis of Stylops. 3. Anatomy of the Mouth of Stylops. 4. Comparative Anatomy of

the Mouth of Stylops. 5. Anatomy of the Pro- Meso- and Metathorax of Stylops. 6. Comparative Anatomy of the Pro- Meso- and Metathorax of Stylops.

§ 1. *Economy and Metamorphosis of Stylops.*

The egg of Stylops is unknown to naturalists : the inference to be drawn from appearances hereafter to be detailed is that, it is hatched prior to its extrusion, in fact, that the female Stylops is pseudo-viviparous or ovo-viviparous.

The larvæ, on their first entrance into life, and they have been observed positively in the act of escape from the parent, are excessively minute : they possess a general resemblance in form to the well-known *Lepisma saccharina*, being stoutest shortly behind the head and tapering gradually to the posterior extremity : they are composed of thirteen very distinct segments, and the tapering commences at or after the fourth : the first segment, evidently the head, is flattened, rounded and obtuse ; and the antennæ, supposing them present, are so minute as hitherto to have escaped notice : the dorsal surface of this anterior segment or head exhibits two dark, distant spots, which have somewhat the appearance of eyes, but, except from analogy, I find no evidence of their being such : the pro- meso- and metathorax are each furnished with a pair of moderately long legs ; these are usually curved and directed forwards : each of the segments following the metathorax as far as the twelfth inclusive, has, at each posterior angle, two or more minute setæ directly backwards, and the last segment or telum is furnished with two larger and very distinct setæ, equal to half the body in length, and situated on minute, but distinct papillæ.

The larvæ, which are excessively numerous, are found on the abdomens of bees, chiefly those of the genus *Andrena*, nestling among the hairs : in this situation it is very evident that they must accompany the bee in all her wanderings, whether she visit flowers for food or to provision her nest, or whether she occupy herself in the more laborious task of preparing the habitation for her young. No doubt or difficulty therefore attends the introduction of the foetal larva of Stylops into the nest of the bee, on whose larvæ it is about to become a parasite : but a hiatus certainly occurs at this point of its history ; for it must be recollected that at the time the parent bee is engaged in excavating, constructing, and provisioning its nest for its future progeny, there are absolutely no bee-larvæ in the nest : the laying of the

egg is the last act prior to closing the cell, and the foetal larva of *Stylops* which we may reasonably enough suppose left in the nest by the passing and repassing of the bee, must remain for some days without food, or must devour a portion of the pollen or honey stored for the larva of the bee.

However this may be, it soon undergoes an important transformation, analogous to that which I have characterized as the foetal metamorphosis of Crustacea; that is to say, on undergoing its first ecdysis, it assumes a normal form and habit; and I consider it desirable that I should, in a pointed manner, invite the attention of entomologists to this peculiar metamorphosis in the larva of *Stylops* which I term foetal, for it is of great moment in the present enquiry, and furnishes us not merely with the means of clearing up a formidable difficulty in the history of *Stylops* itself, but at the same time furnishes us with a most valuable clew to its affinities, for it will be seen in the sequel that the larvæ of other insects possess a foetal metamorphosis, and that such larvæ present also very obvious structural affinities to that of *Stylops*. The larva, with its first skin, sheds also its legs, and becomes perfectly, or at least apparently, apod; it pierces the soft thin skin of the bee-larva, enters the interior and feeds on its juices, like the ichneumon-larva in the caterpillar of a butterfly, without attacking any vital part or causing its supporter any serious injury. Dr. Siebold, to whom we are indebted for the major part of these interesting discoveries, informs us that, in its transformed state the *Stylops*-larva appears to have a distinct mouth and jaws, a simple cœcal intestine, and that he could discover no anal aperture. The number of segments is now reduced to nine, the four anterior ones being united, and forming a single large and square segment, which he calls the cephalothorax: in this state Dr. Siebold adds, that he could readily distinguish the males from the females, the cephalothorax of the males being arched and conical, and the telum or last segment straight and pointed; whereas in the females the cephalothorax is rounded or truncated, and the telum is large and rounded. The position of this larva is described by Jurine, who informs us that the anus or telum is fixed between the segments of the bee's abdomen when that insect has reached the imago state, and that the head is directed towards the thorax of the bee. It is right in this place also to observe, that Jurine, and other competent observers, have failed to discover the mouth, so confidently spoken of by Siebold. Under these circumstances, no stress will be laid either on the absence or presence

of the mouth, and no attempt will be made to draw conclusions therefrom.

The time spent by the *Stylops* in the larva state has not been ascertained with precision, nor is it very probable that this will ever be the case: but at that period of the year when the bee appears in the imago state, and the presence of the parasite is detected by the protrusion of its anal extremity between the segments of her abdomen, the final ecdysis of the larva does not appear to have taken place: supposing, therefore, the larva of the *Stylops* to have been left in the domicile of the bee in June, and that the bee of the succeeding generation still retains the parasite unchanged, when it emerges in March or April, we find that it has passed ten months in the larva state. The bee itself, commonly undergoes the metamorphic ecdysis at a much earlier period, and I have on many occasions dug up the pupæ of *Andrenæ* as early as August, and the perfect insects in December, indeed so frequently has this been the case, that I incline to suppose that the bee is generally mature and fit for emerging during the whole of the winter, and merely awaits a degree of atmospheric warmth suited to its requirings to burst its cell and make its appearance on the wing. It should here be observed that all infested specimens of bees thus prematurely exhumed, exhibit very distinctly the extremity of the *Stylops*-larva protruding between the abdominal segments; and this, it must be observed, clearly establishes the fact that the parasite makes its entrance while the bee is in its larva state, and not as once surmised, after it has arrived at maturity.

I have already said, that the period spent by the *Stylops* in the larva state has never been ascertained with precision; that in the pupa state is also unascertained, but it is certainly very brief; it has only been observed in a few instances, and only in one sex, *viz.*, the male. In the pupa state, the male *Stylops* has every part of the imago perfectly and distinctly visible; the antennæ, legs, and wings are quite detached from the body, but are enclosed in a delicate transparent pellicle: the hind wings have not acquired their development, but reach about half the length of the abdomen, and are appressed closely to the sides: the pupa, in every respect, resembles an imago which has died from immersion in spirits prior to the complete expansion of its wings: it is in all respects an imago, but an imago arrested by death before it had taken flight. It will perhaps be said that the pupa here described, differs from that figured and characterized by several entomologists of repute: the truth is, that the

entomologists in question, have never met with the pupa of the male *Stylops*, or they never would have published the erroneous figures and accounts to which I refer; their supposed pupa is either the adult female, or the larva of the same sex.

The adult male *Stylops* usually emerges in May or June: it leaves a vast and unsightly cavity in the abdomen of the bee, and in this cavity have been found two crumpled up pellicles, from which it has escaped, the first, doubtless, on assuming the pupa state; the second, on attaining that of imago. Away it flies, in an undulating zig-zag manner, and is distinguished from all other insects of its size by the whiteness of its wings: it seeks those sunny spots in which the *Andrenæ* so much delight, and alights on the bees themselves in search of one whose abdomen contains an adult female: the bee, thus visited, appears excessively annoyed, and uses all manner of extraordinary exertions to get rid of its unwelcome, but tenacious companion. The abdomen of the male *Stylops* is comparatively small and slender; it is extremely pliable, is capable of being twisted about in all directions, and is used for the purpose of smoothing down or cleaning the hind wings.

The adult female *Stylops* is totally different from the male, being little more than an apod maggot; as far as the observations of naturalists have extended, there is no trace of legs, no distinct head, and, in fact, no single character, except the reproductive faculty to induce the conclusion that the creature has arrived at maturity. It never leaves the abdomen of the bee, but there remains until death, which probably takes place as soon as the young have escaped, and the body of the parent has become a mere empty sac. The head is deeply immersed in the bee, the anal segment or telum protruding between the segments of the bee's abdomen: this position is, of course, equally adapted for receiving the embraces of the male, and for allowing free egress for the young. The telum is remarkably separated from the remaining segments by a kind of neck: it seems to serve as a pouch or marsupium for the reception of the newly-hatched larvæ, which, after descending from the ovary, where it would appear they quit the egg, accumulate here by hundreds. Through a transverse slit in this marsupium, the larvæ escape and spread themselves over the abdomen of the bee as already described; this transverse slit is on the upper side of the marsupium and placed considerably before its extremity. All writers agree in describing the marsupium as the head, and the slit as the mouth; they also usually consider the perfect female to be the pupa, without noticing the sex, and without

suggesting that there may be a difference between the two : thus we are told of *the pupa of a winged insect producing young through its mouth*. The reason for my not embracing this view of the subject, is that three conclusions are thus begged ; *first*, that in Stylops, the pupa produces living young ; *secondly*, that the head is filled with these living young ; and *thirdly*, that the living young escape through the mouth : both positive observation and analogical reasoning lead to the converse of these conclusions, and therefore the enquiry is not advanced by adopting them. I do not say they are untrue, but I maintain that in the *first* place, they are unproved ; in the *second* place they are improbable ; in the *third* place, they are unnecessary.

§ 2. Comparative Economy and Metamorphosis of Stylops.

The penultimate state, or that immediately preceding the last ecdysis, is that on which the metamorphic method is founded, this state is called the pupa, and its differences are ranged under three heads. *First*, it is called isomorphous, when it resembles the imago in structure, in activity, in eating, and all respects, except in the perfect development of wings. *Secondly*, it is called necromorphous, when it resembles the imago in all respects, except in being perfectly quiescent, as though dead. *Thirdly*, it is amorphous, when it has no similarity to the imago, either in figure or activity.* The penultimate or pupa state of Stylops is necromorphous. The necromorphous classes are Hymenoptera and Coleoptera. The pupa of Stylops has no character by which it can be distinguished from the usual pupæ of these two classes. I know of no insect in the isomorphous or amorphous classes that presents any available similarity to Stylops in its pupa state. We have, therefore, no choice but to regard Stylops as belonging to the metamorphic class Necromorpha. It cannot be said to have an *affinity* with this class : such an expression would not convey the truth ; it possesses *all* the characters of the class *in their typical or normal state*.

The metamorphic or double class Necromorpha exactly corresponds with the two alary or single classes Hymenoptera and Coleoptera : as the pupa of these is exactly similar, it becomes necessary to

* See a more detailed account of the metamorphic method in the 'Familiar Introduction to the History of Insects,' page 73.

consult the larva for comparison. The class Hymenoptera divides readily into the following minor groups:—

PHYLLOPHAGA, of which the larva feeds on leaves: ex. *Tenthredo*.

XYLOPHAGA, of which the larva feeds on wood: ex. *Sirex*.

CECIDOPHAGA, of which the larva feeds on galls: ex. *Cynips*.

ERUCOPHAGA, of which the larva feeds on the interior of other larvæ: ex. *Ichneumon*.

ENTOMOPHAGA, of which the larva feeds on insects provided by the parent: ex. *Spheg*.

PANTOPHAGA, of which the larva feeds on almost every kind of animal or vegetable food provided by the parent: ex. *Vespa*.

ANTHOPHAGA, of which the larva feeds on the honey and pollen of flowers provided by the parent: ex. *Apis*.

In all these groups the larvæ are perfectly well known: in the first they are long, cylindrical caterpillars, with six legs, and ten or twelve prehensile abdominal organs that serve the same purpose: in the second, they are large white cylindrical maggots, with six short legs, just sufficient to enable them to move in the passages they have made in the wood on which they feed: in the remaining five, the larvæ are apod, obese maggots: in none has any metamorphic character been detected, and in none is there any, even the slightest structural resemblance to the foetal larva of Stylops. There exists, however, a considerable analogy in economy between the metamorphic larva of Stylops when metamorphosed and the ametabolous larva of Ichneumon; the principal difference between the two being the fixedness of the former, and the freedom of the latter, while immersed in the bowels of their respective prey: it must certainly be admitted, that in their economy at this period there is great similarity; and this similarity has induced authors to question whether Stylops might not be included among the erucophagous Hymenoptera: but such a conclusion, on grounds so slender, is altogether inadmissible; a parity of reasoning would transfer Tenthredo to the Lepidoptera, and Sirex to the macroceratous Coleoptera: all that can be made of the fact in question is this, that, in one point of its economy, and at one period of its existence, the larva of Stylops resembles that of Ichneumon.

We now turn to the Coleoptera, divided into seven groups by the structure and economy of the larva, but named from a parallel

discrepancy in the usual structure of the antennæ of the perfect insect.

SCHISMATOCERA, in which the antennæ have a lamellated club: ex. *Scarabæus*.

CORDYLOCERA, in which the antennæ have a comparatively solid club: ex. *Silpha*.

NEMATOCERA, in which the antennæ are filiform: ex. *Carabus*.

MACROCERA, in which the antennæ are filiform and remarkably long: ex. *Cerambyx*.

BRACHYCERA, in which the antennæ are subfiliform and short: ex. *Chrysomela*.

PRIONOCERA, in which the antennæ are pectinated or serrated: ex. *Elater*.

HORMOCERA, in which the antennæ are moniliform: ex. *Blaps*.

It will, perhaps, save the reader's time and my own, if we dismiss without investigation, such of these groups as present *no* similarity in their larvæ to that of Stylops, these are the Schismatocera and Macroceræ. Among the other groups there are abundant instances of partial similarity to the foetal larva of Stylops, but in the subdivisions of one of them this similarity becomes very striking. I allude to the Hormocera, a truly diversified group, but composed of genera associated by important and constant characters; the most marked of which, is that they are all heteromorous. From these I select a few examples.

Sitaris humeralis. The foetal larva of this beetle is extremely minute, active and hexapod: its general figure resembles that of *Lepisma saccharina*, but it is somewhat more flattened; the head is marked by a distinct indentation or neck, and has two dark spots, which may be supposed eyes, and two distinct antennæ which are about the same length as the head; these are (perhaps) four-jointed and terminate in a seta: there are twelve other segments, the last of which is furnished with two short appendages. We have no record of any progressive growth or development of this larva; its history and structure are alike unknown until long after its metamorphosis; it then appears as a white, obese, fleshy, apod maggot, in the nest of that well-known bee *Anthophora retusa*: whether it enters the larva of the bee and feeds on its substance, or devours the food stored by the parent has not been determined: it is, however, quite certain

that its final change is completed within the bee's cell, and that it emerges from this a perfectly developed beetle.

Symbius Blattarum. The larva very closely resembles that of *Sitaris* in figure; but has no anal appendages or setæ. I cannot make out whether it undergoes a foetal metamorphosis. It inhabits the body of the cockroach (*Blatta*), and feeds upon the interior. The female retains the larva form, never assuming the appearance of a beetle.

Horia maculata. The full-grown larva is obese, fleshy, and nearly apod: it has indeed six legs, but these are very short and small: it feeds in the cell of a wood-boring bee, and there undergoes its metamorphosis. As in the preceding instance, it has not been ascertained whether the larva of *Horia* feeds on the bee-larva or on its food.

Apalus bimaculatus. The foetal larva is excessively minute, active, and in structure resembles that of *Meloë*, which I shall next describe. It has not been traced beyond this foetal state, there is no doubt that it becomes parasitic, although its history is at present unknown.

Meloë Proscarabæus. The foetal larva of this insect has long been well known to entomologists, but for some reason its true nature has been doubted by two entomologists of great eminence, Dufour and Kirby, both of whom regard it an ametabolous parasite, the former describing it as a *Triungulus*, the latter as a *Pediculus*. Very many years have now elapsed since I solved this matter to my complete satisfaction: I could not believe the statement so confidently made by De Geer, although at that very time repeated by a friend from actual observation, that the very minute active parasites of wild bees were the larvæ of that ponderous beetle *Meloë*: why did they grow no bigger? what could they feed on? I procured the females of *Meloë*; I confined them with abundance of food, and a supply of light and damp earth; and I had the satisfaction to see that they burrowed in the earth; formed a kind of cell or receptacle, apparently by kneading the earth; filled the receptacle with a prodigious mass of minute yellow eggs; and again returned to the surface of the earth to devour leaves and grass as before. I watched these eggs day by day, and at last I had the satisfaction to see them produce minute active little larvæ, with six longish curved prehensile legs, and two long caudal setæ; in fact, they were the *Triungulus Andrenatarum* of Dufour, and the *Pediculus Melittæ* of Kirby. This hatching took place in the autumn or late in the summer, and on the

very day it occurred, I went to several places which I had previously known to be favourite resorts of *Meloë*, and there I found the flowers of the dandelion covered with the same creatures, and I captured on the flowers no less than eighty-five specimens of *Panurgus ursinus*—a bee then new to me,—the whole of which were infested with this parasite, two, three, four, or five on each: I compared those taken from the bees and those bred by myself, and found them absolutely identical. This larva is proportionately longer, and more linear than those of *Sitaris* and *Symbius*; the antennæ, legs, and caudal setæ are longer; the head and thoracic segments are more distinct. When on the body of the bee, these little larvæ nestle among the hairs precisely in the same way as those of *Stylops*, and consequently are in this position conveyed into the nest of the bee whenever she returns home. This attachment to the bee seems for conveyance only, as remarked by Mr. Newport (*Zool.* 1241), to whom we are indebted for the knowledge we possess of its subsequent history. It appears, that after entering the nest of the bee this little creature, like the foetal *Stylops*, undergoes a metamorphosis; it loses its legs, its slender, elongate figure, and its activity, and becomes a large, white, fleshy, apod maggot, bearing no resemblance whatever to the earlier stage of its own existence. It is not supposed that this larva, now larger than that of the bee, can feed within the latter: it were more rational to believe that it devours the provisions provided by the parent-bee for her progeny.

The foetal larvæ of *Cantharis* and *Lytta* are said to resemble that of *Meloë*: that of the very common *Ripiphorus paradoxus* must be referred to the same family, and it is a matter of regret that the history of this well-known parasite of the wasp has never been traced: all that we know, is, that the perfect insects emerge from the cells of wasps in the same manner as the wasps themselves, a fact, which, combined with its structure, compel us to refer it to this tribe of parasites.

Now, confining our attention to three species, *Stylops Melittæ*, *Sitaris humeralis*, and *Meloë Proscarabæus*, and abandoning for the present, all notice of others apparently allied, but whose economy has not yet been ascertained; we find they all possess a foetal metamorphosis, *i.e.*, the larva is hatched under an abnormal or incomplete form, a form in which it is unable to eat or grow; and which appears only designed to exist until a transit has been achieved by adventitious circumstances to a locality whence it *can* eat and grow, and follow out its subsequent metamorphoses. The enormous number of

the foetal, compared with the adolescent larvæ of all those insects, cannot escape observation, and appears an especial provision of nature for the preservation of each; myriads must perish, without ever possessing a chance of accomplishing the first, or foetal ecdysis, or metamorphosis. When, with the cautious and scrutinizing eyes of entomologists, we compare the structure of these three larvæ, we find them to possess distinctive characters, whereby each may be readily known from either of the others. It is not my object to conceal, or to palliate these differences, but rather to invite attention to their careful examination and due appreciation; for, supposing, as I do suppose, that they are related, by certain analogies in structure, present economy, and subsequent metamorphosis, still, I neither contend nor imagine that that relation is sufficiently near to warrant our placing them consecutively in any arrangement: the genera *Apalus*, *Symbius*, *Ripidius* (if distinct), *Myodites* (or *Myodes*), *Ripiphorus*, and many others, some known, and others yet to be discovered, intermix with that group to which *Stylops*, *Sitaris*, and *Meloë* appear to belong, and in all probability, intervene between them. I would, however, invite especial attention to the fact, that the discrepancy among these foetal larvæ is not more strongly marked between the genera *Stylops* and *Meloë*, or between *Stylops* and *Sitaris*, than it is between *Sitaris* and *Meloë*; indeed, in the last instance it is most observable; and yet no one will doubt the existence of an approach between the two last-named insects; an obvious parity in economy, metamorphosis, habit, and structure: so that the discrepancy of the *Stylops*-larva from either being less than their mutual discrepancy, cannot be availed of as an objection to the association of the three: but, since its presence rather harmonizes the group, rather increases than diminishes, the general uniformity of the group, and since it will enter no other group in *Coleoptera* or any other class, because none other possesses *any* parity of structure, economy and metamorphosis *combined*; and none other a *marked* parity of either structure, economy or metamorphosis, we have no option in a metamorphic system where to locate *Stylops*; we must place it in the necromorphous class *Coleoptera*, and in that division of the class in which the parasitic heteromerous beetles have been associated by universal consent.

In opposition to this view, should it be contended that the parasitism of *Stylops* and *Meloë* are not identical, *Stylops* being internal, I am willing to admit the fact, but not the objection; for in this respect *Stylops* and *Symbius* agree, although *Symbius* and *Meloë* dif-

fer; and there is very strong ground for believing that Stylops and Sitaris agree, and that Sitaris and Meloë differ; and he were a shallow systematist, who should, on this ground, remove Symbius or Sitaris from the Coleoptera and transplant it to the Strepsiptera, yet such a result must follow the establishment of the objection under consideration. By a parity of reasoning, the Ichneumons and golden-wasps and cuckow-bees could not be associated in the great class of Hymenoptera.

EDWARD NEWMAN.

In concluding this portion of the inquiry, I would earnestly entreat the reader to confine his attention to the characters discussed; and if he considers it necessary to reply, to restrict that reply to the observations made on economy and metamorphosis, and the conclusions drawn therefrom. I have not assumed that I shall derive any support to my theory from an anatomical examination of the imago, let that speak for itself when printed: I warn the reader that an appeal from economy to anatomy, in the present stage of the inquiry, must be regarded as evasory, and as exhibiting an inability to grapple *fairly* with the subject under discussion.—*E. N.*

(To be continued).

Capture of Claviger foveolatus in Oxfordshire.—As Mr. Willoughby Beauchamp and myself were collecting insects near the peat field at Weston, on the 15th of this month, we were so fortunate as to meet with a fine specimen of the Claviger foveolatus in a nest of the small black ant, (*F. fusca*). I have forwarded this notice of its capture in case you should consider it worthy of inserting in the 'Zoologist,' as I am not aware that this singular insect has occurred in this neighbourhood since it was originally discovered by Mr. Westwood in Wychwood Forest. — *A. Matthews; Weston-on-the-Green, May 24th, 1847.*

Capture of Omius Bohemani.—Among a collection of insects received from Dr. Johnston, I find a specimen of Omius Bohemani, taken in Berwickshire during the past month. As this is the first instance of its occurrence in Scotland, it may be worthy of notice. It appears to be a vernal insect, as of five specimens which I swept up in this vicinity, on the banks of the Derwent, in 1845, all were taken in May and June.—*James Hardy; Gateshead, May 6th, 1847.*

Habits of Haltica vittata.—Haltica vittata, in company with H. Napi, frequents Cardamine amara, and injures the young shoots. It is a vernal species, and though local, is sometimes abundant. In March of this season, I found a specimen of it and H. Napi, buried deep in the marshy soil in which their favourite plant grows.—*Id.*

Occurrence of Macroplëa Equiseti near Cambridge.—A specimen of this rare insect was brought to me a few weeks ago, collected from the refuse which was washed up during a late flood. It had but just attained the imago state, and, when found, had not even emerged from the cocoon. Nevertheless, it was on the very point of doing so, for on breaking it open, by mistake, out walked *Macroplëa*, perfect and mature. Professor Henslow informs me that he formerly captured a pair in the river Cam, about two miles from Cambridge, which are now, I believe, in the possession of the Rev. Leonard Jenyns. I have heard the opinion more than once expressed, that the present insect is not distinct from *Zosteræ*. But this can scarcely be correct, the appearance of the two species being in every respect dissimilar. Not to mention less obvious distinctions,—the larger size of *Equiseti*, more robust form, and dark tips of the thighs and tibiæ, at once afford characters, which, when seen, cannot possibly be mistaken.—*T. Vernon Wollaston; Jesus College, Cambridge, May 3rd, 1847.*

Capture of Pissodes Pini at Gosforth, Northumberland.—Within the last few days I have captured a fine series of this rare insect. On the 24th of May, I made a short excursion to Gosforth Woods; and noticing some stumps of Scotch fir (*Pinus sylvestris*), I was led to examine them, in hopes of finding some old favourites, (*Ips*, &c.). In this I was disappointed; but a search of the branches and chips of the same tree, which were lying on the grass, was rewarded with ten specimens of *Pissodes Pini*, living in apparent harmony with the hundreds of *Hylobius Abietis* inhabiting the same situation. A few days later I again visited the locality, with tolerable success, adding a few interesting varieties to my collection, also meeting with a pair of *Ips ferruginea*.—*Thomas John Bold; 42, Bigg Market, Newcastle-upon-Tyne, June 8th, 1847.*

Report of the Microscopical Society of London.

May 19th, 1847.—J. S. BOWERBANK, Esq., F.R.S., President, in the Chair.

A paper by John Quekett, Esq., 'On the minute arrangement of the Capillaries in the respiratory organs of Fishes' was read. The author, after describing briefly the structure and arrangement of capillaries generally, stated that, it was to the microscope that we were mainly indebted for what was known of the capillaries and of the capillary circulation; he then alluded to the large size of the capillaries in the Reptilia, and to their minuteness in the gills of fishes, these last he purposed to consider more in detail. In osseous fish, he stated there were four gills on each side, supported on long, curved, branchial arches. Each gill, consisted either of a single or double series of lancet-shaped filaments attached to the branchial arch like the teeth of a comb. In some animals these filaments or lamellæ, as they have been termed, were united at their bases, and upon them the respiratory mucous membrane was wonderfully plicated, the plicæ lying always in a direction at right angles to the lamella. The arteries which bring the impure blood to the gills run along the convex borders of the branchial arch, whilst the vein ran in the opposite direction. Each artery gave off as many branches as there were lamellæ, the branches divided twice, and then ran along one edge of the plicæ of mucous membrane on the lamellæ, and the vein on the opposite edge and between these vessels was the most minute plexus of capillaries ever yet described: they formed a delicate hexagonal net-work precisely analogous to that

in the lungs of all vertebrate animals, the spaces between the capillaries were much less than the diameter of the capillaries themselves, and in the eel they were so close together, that a tolerably good defining power was required to separate them. The author also exhibited a lamella from the gill of a skate, in which the capillaries were much larger and more plainly seen than in those of the eel. He then concluded by stating that he had been acquainted with this arrangement of vessels for some years past, but never having seen it described in works on the anatomy of fishes, he was induced to lay the same before the Society, as without the aid of the microscope the delicate arrangement of the respiratory vessels in these animals could never have been witnessed.—*J. W.*

Occurrence of a Pine Marten in Surrey.—At a meeting of the Surrey Natural History Society, held at the Museum, Guildford, on Thursday evening, the 3rd of June, R. A. C. Austen, Esq., one of the vice-presidents, informed the Society that a pine marten had been recently caught in a wood near Blackheath, Albury, by Edward Bray, Esq., of Shere.—*A. Irvine ; Guildford, June 4th, 1847.*

The Gyr-Falcon.—"As soon as I got on shore, I saw a multitude of small birds of prey. They keep in flocks, like our sparrows, hopping about everywhere, and perching on hedges and housetops. I anxiously wished for an opportunity to make myself better acquainted with one of them. Presuming that shooting in the town might be displeasing to the inhabitants, who would naturally claim to themselves a sort of exclusive sporting right, I took my gun down to the sea-shore, and there shot one of the birds. It belonged to the gyr-falcon family (*Polyborinidæ*), and was one of the species peculiar to South America (*Polyborus chimango*, Vieil.). The whole of the upper part of the body is brown, but single feathers here and there have a whitish-brown edge. On the tail are several indistinct oblique stripes. The under part of the body is whitish-brown, and is also marked with transverse stripes feebly defined. The bird I shot measured, from the point of the beak to the end of the tail, 1 foot 6½ inches. Though these gyr-falcons live socially together, yet they are very greedy and contentious about their prey. They snap up, as food, all the offal thrown out of doors; and thus they render themselves serviceable to the inhabitants, who consequently do not destroy them. In some of the valleys of Peru I met with these birds again, but very rarely, and always single and solitary. I continued my excursions on the sea-shore, but with little satisfaction, for the pouring rain had driven animals of every kind to their lurking holes."—*Tschudi's Travels in Peru.*

Occurrence of Montagu's Harrier near Kingsbridge.—I beg to inform you of the occurrence of a fine mature female specimen of Montagu's harrier (*Circus Montagui*); the bird was shot near Kingsbridge on the 14th inst., its weight was ten and three-quarter ounces, length eighteen inches, breadth three feet four inches and a half. I found on dissection, the largest of the ovary to be about the size of a pea, and should suppose the bird would not nest until late in the season; to my astonishment, its stomach contained parts of the shells of eggs of small birds, which I suppose to be skylarks and

willow wrens, and one perfect egg of the skylark, which appeared to have been set on about a week, as I found on emptying it, the young to be distinctly formed: there were no remains whatever of anything else. In September last I received a bird (shot by a friend in this neighbourhood, and now in the possession of John Elliott, Esq., of this place), which I suppose to be a young male of this species, with its nesting dress; its weight being somewhat about nine ounces; the colour being of a uniform very dark brown (appearing almost black at a little distance), except a broken patch of white at the nape; the upper tail-coverts, instead of being white, as described of that bird, is of the same dark colour.—*Henry Nicholls, Jun. ; Kingsbridge, South Devon, May 24th, 1847.*

Occurrence of the Osprey and of the Grasshopper Warbler's Nest near Downham Market.—On Monday, the 3rd of May last, an adult male osprey was shot at Shouldham, near this place; and on Monday last, a nest of the grasshopper warbler, containing five eggs, was taken near here: they are all in my possession. If you think the above captures, or either of them, would be interesting to the subscribers to the 'Zoologist,' you would much oblige me by their insertion.—*Cooper Coulcher ; Downham Market, Norfolk, May 27th, 1847.*

Nest of Savi's Warbler near Cambridge.—On Thursday, the 10th of June, I found in a part of our fen near Wicken, about twelve miles from Cambridge, a nest of Savi's warbler, containing three eggs. The nest was placed close to the ground, and is composed entirely of sedge entwined together, and without any interlining. The shy habits of this bird may account for its being so little known; as they are seldom seen or heard except early in the morning, or towards dusk in the evening, when their *peculiar* note may be heard in company with the grasshopper warbler, but from which they are easily distinguished by their softer and higher note. I have also observed them in the fens of Huntingdonshire.—*John Brown ; 30, Bridge Street, Cambridge, June 25th, 1847.*

Java Sparrow breeding in England.—As I have never met with any notice of the Java sparrow (*Fringilla oryzivora*) having bred in England, perhaps the following statement may be acceptable to the readers of the 'Zoologist.' The pair of birds have been in my possession for more than two years, and lived all the last winter in an aviary, thatched, but otherwise open to the external air; and early in May I observed both birds very busily occupied in collecting straws, the stems of dried plantain, and short sticks in one of the compartments of a box placed for the accommodation of some turtle-doves. The young birds (three in number and two addle eggs) were hatched about the 1st of June, but up to the present time, though apparently healthy, and the quill and tail-feathers fully developed, they have made no attempt to leave the nest. I wish just to notice what is stated in the account of this bird in Swainson's 'Zoological Illustrations,' that the male bird only has the white patch on the ear, and the plate is coloured to correspond. Now, both my birds are exactly similar in plumage, and the only difference I can perceive, is, that the one I imagine to be the hen-bird is rather the smaller of the two; but the difference is so slight, that it is almost impossible to tell one from the other, especially as they are both equally attentive to their young family.—*Robert M. Lingwood ; Lyston, near Ross, Herefordshire, June 23rd, 1847.*

Dates of Arrival of Summer Birds at Broadway, Worcestershire.—As you admit into your Journal lists of the appearance and departure of our migratory birds in different localities, I have sent you an account of those most common to this neighbour-

hood. I have kept a journal of such things during the last fifteen years, but I send only the last two, these seasons having been so very different, as to give a fair idea of the variation caused by the weather. The place where I reside is not far from the centre of England, so that the time taken by the birds to travel from the coast to the interior of the country may be pretty accurately ascertained. The winter visitants shall follow in due time.

1846.

Chiffchaff	March 31
Blackcap	April 5
Redstart	April 10
Wryneck	April 10
Swallow	April 14
Willow wren	April 18
Tree pipit	April 31
Wheatear	April 23
Nightingale	April 23
Yellow wagtail	April 23
Whitethroat	April 23
Cuckow	April 25
Goatsucker	May 1
House martin.....	May 1
Swift.....	May 5
Red-backed shrike	May 16
Spotted flycatcher.....	May 20

1847.

Chiffchaff	March 26
Wheatear.....	March 27
Redstart	March 31
Wryneck	April 16
Whinchat	April 19
Tree pipit	April 21
Swallow.....	April 23
Willow wren.....	April 23
Cuckow	April 26
House martin	April 29
Nightingale	April 30
Whitethroat	April 30
Yellow wagtail	April 30
Goatsucker	May 5
Blackcap	May 8
Swift	May 11
Red-backed shrike	May 11
Spotted flycatcher	May 20

—John N. Beadles ; Broadway, Worcestershire, June 16th, 1847.

*Extracts from the 'Birds of Jamaica, by Philip Henry Gosse.'**

[When Mr. Gosse left these shores, on a visit to the beautiful Island of Jamaica, he kindly promised to send me an occasional contribution for the 'Zoologist,' a hasty sketch of his observations as he passed from place to place: his time, however, seems to have been too fully occupied to recollect the hopes he had excited, and now the result of his observations appears in a goodly tome of four hundred pages. It is a choice volume, and almost without an equal in modern natural-history literature. The following extracts will be agreeable to all our readers.—Edward Newman].

The John-Crow Vulture (Cathartes aura).—"A poor German immigrant, who lived alone in a detached cottage in this town, rose from his bed, after a two days' confinement by fever, to purchase in the market some fresh meat for a little soup. Before he could do more than prepare the several ingredients of herbs and roots, and put his meat in water for the preparation of his pottage, the paroxysm of fever had returned, and he laid himself on his bed, exhausted. Two days elapsed in this state of helplessness and inanition, by which time the mass of meat and potherbs had putrefied. The stench becoming very perceptible in the neighbourhood, vulture after vulture, as they sailed past, were observed always to descend to the cottage of the German, and to sweep round as if they had tracked some putrid carcase, but failed to find exactly

where it was. This led the neighbours to apprehend that the poor man lay dead in his cottage, as no one had seen him for the two days last past. His door was broken open; he was found in a state of helpless feebleness; but the room was most insufferably offensive from something putrefying, which could not immediately be found; for the fever having deprived the German of his wits, he had no recollection of his uncooked mess of meat and herbs. No one imagining that the kitchen pot could contain anything offensive, search was made everywhere but in the right place. At last, the pot-lid was lifted, and the cause of the insupportable stench discovered in the corrupted soup-meat.

"Here we have the sense of smelling directing the vultures, without any assistance from the sense of sight, and discovering unerringly the locality of the putrid animal matter, when even the neighbours were at fault in their patient search.

"Some few days succeeding this occurrence, after a night and morning of heavy rain, in which our streets had been inundated to the depth of a foot, and flood after flood had been sweeping to the river the drainage of the whole town, a piece of recent offal had been brought down from some of the yards where an animal had been slaughtered, and lodged in the street. A vulture, beating about in search of food, dashed in a slanting direction from a considerable height, and, just resting, without closing his wings, snatched up the fresh piece of flesh and carried it off.

"Here was the sense of sight unassisted by that of smelling, for the meat was too recent to communicate any taint to the morning air, and the vulture stooped to it from a very far distance.

"On another occasion, very near to the time when these facts attracted my notice, a dead rat had been thrown out, early in the morning, into the street, having been caught in the previous night. Two vultures sailing over head in quest of a morning meal descended at the same time, stooping to the dead rat, the one from the south the other from the north, and both seized the object of attraction at the same moment.

"Here again was the vision, unaided by the sensitiveness of the nostrils, directing two birds, with the same appetite, at the same moment, to the same object.

"For the next example I am indebted to the records of a police court. A clerk in the engineer department at Up-park Camp, brought before the magistrates of St. Andrew's, on the 20th of January, 1840, a man who had been beset in the night by the dogs of the barracks. The poultry-yard had been repeatedly robbed; and this person was supposed to have been prowling after the roost-fowls at the time the dogs rose upon him. This case had been heard, and the man committed to the house of correction, when a complaint was presented against another man, whom Major G., also of the camp, had detected under similar circumstances, and lodged in the guard-house.

"Two days after his detection, the Major observed some carrion vultures hovering about a spot in the fields, and on sending to see what was the matter, a Kilmarnock cap, containing a dead fowl and some eggs, tied up in a pair of old trowsers, was found very near to the spot where the prisoner was caught. This discovery, by the aid of the vultures, confirming the suspicion against the prisoner, he was condemned.

"The last instance that I shall relate is one in which the senses of hearing, seeing, and smelling were all exercised, but not under the influence of the usual appetite for carrion food, but where the object was a living, though wounded animal.

"A person in the neighbourhood of the town, having his pastures much trespassed on by vagrant hogs, resorted to his gun to rid himself of the annoyance. A pig,

which had been mortally wounded, and had run squealing and trailing his blood through the grass, had not gone far before it fell in the agonies of death. At the moment the animal was perceived to be unable to rise, three vultures, at the same instant, descended upon it, attracted no doubt by the cries of the dying pig, and by the scent of its reeking blood, and while it was yet struggling for life, began to tear open its wounds, and devour it."—p. 2.

The Potoo (Nyctibius jamaicensis).—"The statement of Cuvier, that 'the proportions of the *Nyctibius* completely disqualify it from rising from a level surface,' I saw disproved; for notwithstanding the shortness of the tarsi, (and it is, indeed, extreme), my bird repeatedly alighted on, and rose from, the floor, without effort. When resting on the floor, the wings were usually spread; when perching, they about reached the tip of the tail. If I may judge of the habits of the potoo from what little I have observed of it when at liberty, and from the manners of my captive specimen, I presume that, notwithstanding the powerful wings, it flies but little; but that, sitting on some post of observation, it watches there till some crepuscular beetle wings by, on which it sallies out, and having captured it with its cavernous and viscid mouth, returns immediately to its station. Mr. Swainson appears to consider that the stiff bristles, with which many *Caprimulgidae* are armed, have a manifest relation to the size and power of their prey, beetles and large moths, while these appendages are not needed in the swallows, their prey consisting of 'little soft insects.'—(*Class Birds*). But here is a species whose prey is the hardest and most rigid beetles, of large size, and often set with formidable horns, which has no true rictal bristles at all!"—p. 45.

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"White's conjecture of the purpose to which the serrated toe of the nightjar is applied, namely, the better holding of the prey which it takes with its foot while flying, would have been more than rendered highly probable by an inspection of the foot of the *Nyctibius*. The inner front toe and the back toe are spread out by the great extension of the enveloping flesh of the phalanges, to such a breadth as to give the foot the character and form of a hand; while the movement of these prehensile organs is so adjusted that the back toe and the three front toes, pressed flat against one another, can enclose anything as effectually as the palms of the hands. The [claw of the] middle toe, which is serrated in the *Caprimulgus*, is simply dilated in the *Nyctibius*, a peculiarity also of the swallows. Whatever deficiency of prehension this may give it, when compared to the power of the serrated nail of the *Caprimulgus*, is amply compensated for in the *Nyctibius* by the palm-like character of the foot, by the extraordinary expansion of the toes, and by the quantity of membrane connecting them together. All this would be a mere waste of power if it did not perform some function like that which White assigned to the foot of the night-jar."—p. 48.

The Palm-swift (Tachornis phœnicobia).—"I observed several small swallows flying above some cocoa-nut palms; they uttered, as they flew, a continued twittering warble, shrill but sweet, which attracted my attention. I commenced a careful search with my eye of the under surface of the fronds and spadices of one, and at length discerned some masses of cotton projecting from some of the spathes, which I concluded to be their nests. This conjecture proved correct; for presently I discovered a bird clinging to one of these masses, which I shot, and found to be this white-rumped swift. On my lad's attempt to climb the tree, eight or ten birds flew in succession from various parts, where they had been concealed before. The tree, however,

was too smooth to be climbed, and as we watched beneath for the birds to return, one and another came, but charily, and entered their respective nests. Although several other cocoa-nuts were close by, I could not discern that any one of them was tenanted but this, and this so numerously, whence I inferred the social disposition of the bird. At some distance we found another tree, at the foot of which lay the dried fronds, spadices, and spathes, which had been, in the course of growth, thrown off; and in these were many nests. They were formed chiefly in the hollow spathes, and were placed in a series of three or four in a spathe, one above another, and agglutinated together, but with a kind of gallery along the side communicating with each. The material seemed only feathers and silk-cotton (the down of the Bombax); the former very largely used, the most downy placed within, the cotton principally without; the whole felted closely, and cemented together by some slimy fluid, now dry, probably the saliva. With this they were glued to the spathe, and that so strongly, that in tearing one out it brought away the integument of the spathe. The walls of the nests, though for the most part only about a quarter of an inch thick, were felted so strongly as to be tenacious almost as cloth. Some were placed within those spathes that yet contained the spadices; and in this case the various footstalks of the fruit were enclosed in a large mass of the materials, the walls being greatly thickened. All the nests were evidently old ones, for the Bombax had not yet perfected its cotton; and hence I infer that these birds continue from year to year to occupy the same nests, until they are thrown off by the growth of the tree. The entrance to the nests, which were subglobular, was near the bottom."—p. 60.

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"Near the middle of May, my servant Sam, being engaged at Culloden, in Westmoreland parish, cutting the fronds of the palmetto (*Chamærops*) for thatching, found these little birds nestling in abundance, and procured for me many nests of the present season. Their recent construction, and perhaps the diversity of their situation—for instead of the hollow of a spathe these were attached to the plaited surface of the fronds—gave them a different appearance from the former specimens. Many of these I have now in my possession. They have a singularly hairy appearance, being composed almost exclusively of the flax-like cotton of the Bombax, and, when separated, are not unlike a doll's wig. They are in the form of those watch-fobs which are hung at beds' heads, the backs being firmly glued by saliva to the under surface of the fronds, the impressions of the plaits of which are conspicuous on the nests when separated. The thickness is slight in the upper part, but in the lower it is much increased, the depth of the cup descending very little below the opening. The cotton is cemented firmly together, as in the case of the others, but externally it is allowed to hang in filamentous locks, having a woolly, but not altogether a ragged appearance. A few feathers are intermixed, but only singly, and not in any part specially. One specimen is double, two nests having been constructed so close side by side, that there is but a partition wall between them. Many nests had eggs, but in throwing down the fronds all were broken but one, which I now have. It is pure white, unspotted, larger at one end, measuring thirteen-twentieths of an inch by nine-twentieths. The average dimensions of the nests were about 5 inches high, and 3½ wide."—p. 62.

The Green Tody or Robin Redbreast (Todus viridis).—"One captured with a net in April, on being turned into a room, began immediately to catch flies and other minute insects that flitted about, particularly little destructive Tineadæ that infested my dried birds. At this employment he continued incessantly, and most successfully, all

that evening, and all the next day from earliest dawn till dusk. He would sit on the edge of the tables, on the lines, on shelves, or on the floor, ever glancing about, now and then flitting up into the air, when the snap of his beak announced a capture, and he returned to some station to eat it. He would peep into the lowest and darkest corners, even under the tables, for the little globose, long-legged spiders, which he would drag from their webs and swallow. He sought these also about the ceiling and walls, and found very many. I have said that he continued at this employment all day without intermission, and, though I took no account, I judged that, on an average, he made a capture per minute. We may thus form some idea of the immense number of insects destroyed by these and similar birds; bearing in mind that this was in a room, where the human eye scarcely recognized a dozen insects altogether; and that in the free air insects would doubtless be much more numerous. Water in a basin was in the room, but I did not see him drink, though occasionally he perched on the brim; and when I inserted his beak into the water he would not drink. Though so actively engaged in his own occupation, he cared nothing for the presence of man; he sometimes alighted voluntarily on our heads, shoulders, or fingers; and when sitting would permit me at any time to put my hand over him and take him up; though when in the hand he would struggle to get out. He seemed likely to thrive, but incautiously settling in front of a dove-cage, a surly baldpate poked his head through the wires, and with his beak aimed a cruel blow at the pretty green head of the unoffending and unsuspecting tody. He appeared not to mind it at first, but did not again fly, and about an hour afterwards, on my taking him into my hand, and throwing him up, he could only flutter to the ground, and on laying him on the table, he stretched out his little feet, shivered, and died."—p. 74.

The Long-tailed Humming-bird (Trochilus Polytmus).—"While I lingered in the romantic place, picking up some of the land shells which were scattered among the rocks, suddenly I heard the whirr of a humming bird, and, looking up, saw a female Polytmus hovering opposite the nest, with a mass of silk cotton in her beak. Deterred by the sight of me, she presently retired to a twig, a few paces distant, on which she sat. I immediately sunk down among the rocks as quietly as possible, and remained perfectly still. In a few seconds she came again, and after hovering a moment disappeared behind one of the projections, whence in a few seconds she emerged again and flew off. I then examined the place, and found to my delight a new nest, in all respects like the old one, but unfinished, affixed to another twig not a yard from it. I again sat down among the stones in front, where I could see the nest, not concealing myself, but remaining motionless, waiting for the *petite* bird's reappearance. I had not to wait long: a loud *whirr*, and there she was, suspended in the air before her nest: she soon espied me, and came within a foot of my eyes, hovering just in front of my face. I remained still, however, when I heard the whirring of another just above me, perhaps the male, but I durst not look towards him, lest the turning of my head should frighten the female. In a minute or two the other was gone, and she alighted again on the twig, where she sat some little time preening her feathers, and apparently clearing her mouth from the cotton fibres, for she now and then swiftly projected the tongue an inch and a half from the beak, continuing the same curve as that of the beak. When she arose it was to perform a very interesting action; for she flew to the face of the rock, which was thickly clothed with soft dry moss, and hovering on the wing, as if before a flower, began to pluck the moss, until she had a large bunch of it in her beak; then I saw her fly to the nest, and *having seated herself in it*, proceed to

place the new material, pressing, and arranging, and interweaving the whole with her beak, while she fashioned the cup-like form of the interior by the pressure of her white breast, moving round and round as she sat. My presence appeared to be no hindrance to her proceedings, though only a few feet distant; at length she left again, and I left the place also. On the 8th of April I visited the cave again, and found the nest perfected, and containing two eggs, which were not hatched on the 1st of May, on which day I sent Sam to endeavour to secure both dam and nest. He found her sitting, and had no difficulty in capturing her, which, with the nest and its contents, he carefully brought down to me. I transferred it, having broken one egg by accident, to a cage, and put in the bird; she was mopish, however, and quite neglected the nest, as she did also some flowers which I inserted; sitting moodily on a perch. The next morning she was dead.”—p. 103.

“At my first attempt [to keep humming-birds in confinement], in the spring of 1845, I transferred such as I succeeded in bringing alive, to cages immediately on their arrival at the house, and though they did not beat themselves, they soon sunk under the confinement. Suddenly they would fall to the floor of the cage, and lie motionless with closed eyes; if taken into the hand, they would perhaps seem to revive for a few moments; then throw back the pretty head, or toss it to and fro, as if in great suffering, expand the wings, open the eyes, slightly puff up the feathers of the breast, and die, usually without any convulsive struggle. This was the fate of my first attempts.

“In the autumn, however, they began to be numerous again upon the mountain, and having, on the 13th of November, captured two young males, sucking the pretty pink flowers of *Urena lobata* I brought them home in a covered basket. The tail-feathers of the one were undeveloped, those of the other half their full length. I did not cage them, but turned them out into the open room, in which the daily work of preparing specimens was carried on, having first secured the doors and windows. They were lively but not wild; playful towards each other, and tame with respect to myself, sitting unrestrained for several seconds at a time on my finger. I collected a few flowers and placed them in a vase on a high shelf, and to these they resorted immediately. But I soon found that they paid attention to none but *Asclepias curassavica*, and slightly to a large *Ipomea*. On this I again went out, and gathered a large bunch of *Asclepias*, and was pleased to observe, that on the moment of my entering the room, one flew to the nosegay and sucked while I held it in my hand. The other soon followed, and then both these lovely creatures were buzzing together within an inch of my face, probing the flowers so eagerly as to allow their bodies to be touched without alarm. These flowers being placed in another glass, they visited each bouquet in turn, now and then flying after each other playfully through the room, or alighting on various objects. Though occasionally they flew against the window, they did not flutter and beat themselves at it, but seemed well content with their parole. As they flew, I repeatedly heard them snap the beak, at which times they doubtless caught minute flies. After some time, one of them suddenly sunk down in one corner, and on being taken up seemed dying: it had perhaps struck itself in flying. It lingered awhile, and died. The other continued his vivacity; perceiving that he had exhausted the flowers, I prepared a tube, made of the barrel of a goose-quill, which I inserted into the cork of a bottle, to secure its steadiness and upright position, and filled with juice of sugar-cane. I then took a large *Ipomea*, and having cut off the bottom, I slipped the flower over the tube, so that the quill took the place

of the nectary of the flower. The bird flew to it in a moment, clung to the bottle rim, and bringing his beak perpendicular, thrust it into the tube. It was at once evident that the repast was agreeable, for he continued pumping for several seconds, and on his flying off I found the quill emptied. As he had torn off the flower in his eagerness for more, and even followed the fragments of the corolla, as they lay on the table, to search them, I refilled the quill and put a blossom of the Marvel of Peru into it, so that the flower expanded over the top. The little toper found it again, and after drinking freely, withdrew his beak, but the blossom was adhering to it as a sheath. This incumbrance he presently got rid of, and then (which was most interesting to me) he returned immediately, and inserting his beak into the bare quill, finished the contents. It was amusing to see the odd position of his head and body as he clung to the bottle with his beak inserted perpendicularly into the cork. Several times in the course of the evening he had recourse to his new fountain, which was as often replenished for him, and at length, about sunset, betook himself to a line stretched across the room for repose. He slept as they all do, with the head not behind the wing, but slightly drawn back upon the shoulders, and in figure reminded me of Mr. Gould's beautiful plate of Trogon resplendens, in miniature. In the morning I found him active before sunrise, already having visited his quill of syrup, which he emptied a second time. After some hours, he flew through a door which I had incautiously left open, and, darting through the window of the next room, escaped, to my no small chagrin."—p. 113.

The Mocking Bird (Mimus polyglottus).—"It is in the stillness of the night, when, like his European namesake [the nightingale], he delights—

‘With wakeful melody to cheer
The livelong hours,’

that the song of this bird is heard to advantage. Sometimes, when, desirous of watching the first flight of *Urania Sloaneus*, I have ascended the mountains before break of day, I have been charmed with the rich gushes and bursts of melody proceeding from this most sweet songster, as he stood on tiptoe on the topmost twig of some sour-sop or orange tree, in the rays of the bright moonlight. Now he is answered by another, and now another joins the chorus from the trees around, till the woods and savannahs are ringing with the delightful sounds of exquisite and innocent joy. Nor is the season of song confined, as in many birds, to that period when courtship and incubation call forth the affections and sympathies of the sexes towards each other. The mocking-bird is vocal at all seasons; and it is probably owing to his permanency of song, as well as to his incomparable variety, that the savannahs and lowland groves of Jamaica are almost always alive with melody, though our singing birds are so few."—p. 145.

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When young are in possession, their presence is no secret; for an unpleasant sound, half hissing, half whistling, is all day long issuing from their unfledged throats: delightful efforts, I dare say, to the fond parents. At this time the old birds are watchful and courageous. If an intruding boy or naturalist approaches their family, they hop from twig to twig, looking on with outstretched neck, in mute but evident solicitude; but any winged visitant, though ever so unconscious of evil intent, and though ever so large, is driven away with fearless pertinacity. The saucy Ani and

tinkling instantly yield the sacred neighbourhood, the brave mocking-bird pursuing a group of three or four, even to several hundred yards distance; and even the John-crow, if he sail near the tree, is instantly attacked and driven from the scene. But the hogs are the creatures that give him the most annoyance. They are ordinarily fed upon the inferior oranges, the fruit being shaken down to them in the evenings; hence they acquire the habit of resorting to the orange trees, to wait for a lucky wind-fall. The mocking-bird, feeling nettled at the intrusion, flies down and begins to peck the hog with all his might: Piggy, not understanding the matter, but pleased with the titillation, gently lies down and turns up his broad side to enjoy it; the poor bird gets into an agony of distress, pecks and pecks again, but only increases the enjoyment of the luxurious intruder, and is at last compelled to give up the effort in despair.”—p. 147.

The Tinkling Grakle (Quiscalus crassirostris).—“Like the ani, the tinkling feeds on the parasites of cattle. Walking among them, and mounting on their backs, they pick off the ticks that so sadly infest the poor beasts, who, as if appreciating the service, offer not the slightest molestation to their kind friends. I one day observed a tinkling thus engaged in feeding her offspring. It was in the picturesque pasture of Peter’s Vale, where kine were numerous. Beneath the grateful shade of a spreading mango, in the heat of the day, a cow was peacefully ruminating; at her feet was the old tinkling, walking round, and looking up at her with an intelligent eye. Presently, she espied a tick upon the cow’s belly, and, leaping up, seized it in her beak; then marching to her sable offspring, who stood looking on a few yards off, she proceeded to deliver the savoury morsel into the throat of her son, who had gaped to the utmost stretch of his throat in eager expectation, even before his mother was near him. This done, she returned, and, again walking round, scrutinized the animal’s body, but discovering nothing more, flew up on the cow’s back, and commenced an investigation there. Just at this moment something alarmed her, and both mother and son flew to a distant tree. It was at the same time, and in the same pasture, that I observed a number of these birds collected in a large bastard cedar that overhung a shallow pool, to which one and another were continually descending, and bathing with great apparent enjoyment; after which each flew to a sunny part of the tree, and fluttered and pecked and ruffled its plumage, that it might dry smoothly and equally.”—p. 219.

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“The taking of places [on the cocoa-nut palms at roosting time] was attended with much squabbling: the alighting of each new comer on a frond causing it to swing, so as greatly to discompose the sitters already in possession, and throw them off their balance; and hence each was received by his fellows with open beaks and raised wings, to prevent his landing. Still, many thrust themselves in among others, pecking right and left in self-defence. The highest horizontal fronds were most in demand, and many of these had, at the close, as many as ten or twelve birds each, sitting side by side in a sable row. When once the birds had left the cotton tree, and selected their places on the palms, they did not return; but places were shifted continually. During the whole time their singular voices were in full cry, and could be heard at a great distance; some idea may be formed of the effect of the whole by imagining two or three hundred small table bells, of varying tones, to be rung at the same time. By half an hour after sunset the arrivals had pretty well ceased, and most of the birds were quietly settled for the night. I visited them on one or two subsequent evenings, but found no material difference in their proceedings.”—p. 223.

The Blue Quit (Euphonia Jamaica).—"February 5th, 1838. Near the piazza of my house a cotton-bush has flung out its knots of white filaments. Hither come the birds at this season, to gather materials for constructing their nests. The blue sparrow, a pretty little frugivorous bird, that sings in our fruit-trees all the year round its merry twittering song, has been busily engaged with his mate collecting bills-full of cotton. It did not seem to be a thing immediately settled that they should set to work and gather their materials at once. They had alighted on the tree as if they had very unexpectedly found what they were seeking. The male began to twitter a song of joy, dancing and jumping about, and the female, intermingling every now and then a chirp, frisked from stem to stem, and did very little more than survey the riches of the tree; at least she plucked now and then a bill-full of the filaments, and spreading it to flaunt to the wind tossed it away, as if she had been merely showing that it every way answered the purpose in length and softness, and was in every respect the thing they wanted. At each of these displays of the kind and quality of the materials, the male intermingled his twittering song with a hoarse succession of notes, which were always the same, *chu, chu, chu, chu, chwit*, to which the female chirped two or three times in succession, then grasping another bill-full of cotton, tossed it away as before, and obtained from the male the same notes of attention and approval. At last they set to work in earnest, gathered a load of the materials drawn out as loosely as they could get it, and filling their bills, started away to the tree, wherever it was, in which they had determined to build their nests."—p. 241.

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"Immediately behind the homestead of Bluefields, a lane, confined for a mile or two between dry-stone walls, leads to the road, which winds in a zig-zag line to the top of the Bluefields ridge. This lane possesses many attractions. By the wall on each side grow trees, which afford grateful shade, and many of them load the evening air with dewy fragrance. Orange-trees profusely planted, give out, in spring, gushes of odour from their waxen blossoms, and in autumn tempt the eye with their "golden fruitage." The Pride of China, lovely in its graceful leaves and spikes of lilac blossoms, and not less sweet-scented than the orange,—the pimento, dense and glossy, with another, but not inferior, character of beauty,—are varied by the less showy, but still valuable, cedar and guazumo. The various species of Echites trail their slender stems and open their brilliant flowers along the top of the wall, and the pretty Banisteria displays its singular yellow blossoms, or scarlet berries at its foot, while, near the top of the lane, tangled and matted masses of the night-blowing Cereus depend from the trees, or sprawl over the walls, expanding their magnificent, sun-like flowers, only to 'the noon of night.' Here and there huge black nests of Termites look like barrels built in the walls, whose loose stones, grey with exposure, and discoloured with many-tinted lichens, afford a sombre relief to the numerous large-leaved Arums that climb and cluster above them. To the left the mountain towers, dark and frowning; the view on the right is bounded by a row of little rounded hills, studded with trees and clumps of pimento. But between the traveller and either, extend the fields of guinea-grass, which are enclosed by these boundary walls. In the autumn, when the grass is grown tall, and the panicles of seed waving in the wind give it a hoary surface, the little grass-quits, both of this and the following species, throng hither in numerous flocks, and perching in rows on the slender stalks, weigh them down, while they rifle them of the farinaceous seeds."—p. 249.

The Yellow-bellied Parroquet (Conurus flaviventer).—"But the precaution of the

poor bird in selecting a locality [in the trunk of a tree], and her perseverance in burrowing into so solid a structure, are not sufficient to ensure her safety or that of her young. The aperture by which she herself enters and departs affords also a ready entrance to a subtle and voracious enemy, the yellow boa. A young friend of mine once observing a parroquet enter into a hole in a large duck-ant's nest, situated on a bastard cedar, mounted to take her eggs or young. Arrived at the place, he cautiously inserted his hand, which presently came in contact with something smooth and soft. He guessed it might be the callow young; but hesitating to trust it, he descended, and proceeded to cut a stick, keeping his eye on the orifice, from which the old bird had not yet flown. Having again mounted, he thrust in the stick, and forced off the whole upper part of the structure, disclosing, to his utter discomfiture and terror, an enormous yellow snake, about whose jaws the feathers of the swallowed parroquet were still adhering, while more of her plumage scattered in the nest revealed her unhappy fate. The serpent instantly darted down the tree, and the astonished youth, certainly not *less* terrified, also descended with precipitation, and ran, as if for life, from the scene."—p. 264.

The Kildeer Plover (Ægialites vociferus).—"One which was shot, and wounded in the wing, I introduced to the doves, in a large packing-case, the front of which was removed and replaced by gauze. Immediately on being put in, it began vigorously charging at the gauze, as if it had no idea of any impediment there, running backward a little way, and then dashing at it; and this without an instant's intermission, now and then leaping up, and uttering its wild cry. For a few minutes its impetuous motions seemed to stupify all the doves, who gazed in astonishment; but presently a young bald-pate, who occupied one of the front corners, a very cross and surly fellow, began to peck and beat the little plover, driving him about the cage without mercy. I had been struck, at the first entry of the bird, with its remarkable height, owing to the length of the tarsi, and the upright, bold attitude in which it stood. At length, to escape the persecutions of the bald-pate, it suddenly squatted down in one of the back corners, bringing the tarsi flat on the ground, and the tibiæ on them, so that I was now struck with its flatness and closeness on the ground; and I saw how it is that we so often hear their cry very near, when we can see no trace of them, and often suddenly lose sight of them when watching them running. I feel assured that this squatting is the bird's natural resource for concealment; for on being alarmed suddenly, its first impulse is to bend partially the heel, bringing the body nearer the ground; if the danger appear to increase, it brings the tarsi flat, the tibiæ still being inclined; the body seems now in contact with the ground; but a greater terror brings it still lower, so that it really appears as if half sunk in the earth; and now no advance of the danger affects it, if there be no opening to run; it lies quite passive; its resource is exhausted.

"My captive lay thus unmoved for awhile, though the restless pea-doves, in running from side to side, walked over it, trampling it under foot at every turn. When it did get up, however, and came to the front, it was again instantly assaulted by the bald-pate, who struck it with his wing, and seized its beak with his own, and pinched it. Pitying it under these inflictions, I took it out, and allowed it to run about the room. Its actions now became quite entertaining; it ran backward and forward with surprising fleetness, but not being used to the smoothness of board, though the floor was not at all polished, and wanting the support of the back toe, its speed was continually causing it to slip, the feet sliding forward, so as to bring the bird down upon

its tail. Now and then it would stop, and make repeated efforts to jump over the skirting-board, which being black, and the wall white, I suppose it mistook the latter for empty space. While doing this, it ever and anon emitted its loud pipe, with startling shrillness. Having run into a corner, it allowed me to take it up in my hand without fluttering. When it stood, it jerked its head up and down. It was exceedingly active; when not lying close for concealment it was not still a moment; besides the flirting of the head and tail, a tremulous motion pervaded the body, so that it seemed to be shivering. When about to take a single step, this was manifested in an odd manner, the foot touching the ground three or four times before it was put down. When it had become more at home, it devoured earth-worms greedily, and would pick minute shells and Entomostraca from a saucer of water, in which was a root of watercress. In the cage, it delighted to stand in its water-saucer, but when loose, the saucer being placed in one corner, it would run rapidly in and out, now and then stopping to pick up the contents."—p. 331.

"The Sultana (Porphyrio Martinica)."—"I was struck with the remarkable elegance of one that I saw by the road-side, about midway between Savanna-le-Mar and Bluefields. It was at one of those pieces of dark water called blue-holes, reputed to be unfathomable. The surface was covered with the leaves and tangled stems of various water-plants, and on these the sultana was walking, supported by its breadth of foot, so that the leaves on which it trod sank only an inch or two, notwithstanding that the bird, according to its usual manner, moved with great deliberation, frequently standing still, and looking leisurely on either side. As it walked over to where the water was less encumbered, it became more immersed, until it seemed to be swimming, yet even then, from the motion of its legs, it was evidently walking, either on the bottom, or on the yielding plants. At the margin of the pool it stood some time, in a dark nook overhung by bushes, where its green and purple hues were finely thrown out by the dark back ground. I could not help thinking what a beautiful addition it would make to an ornamental water in an English park; and the more so, because its confiding tameness allows of approach sufficiently near to admire its brilliancy. Nor are its motions void of elegance; the constant jerking of its pied tail is perhaps rather singular than admirable, but the bridling of its curved and lengthened neck, and the lifting of its feet are certainly graceful."—p. 378.

The Rufous-necked Pelican (Pelecanus fuscus)."—"It is a pleasant sight to see a flock of pelicans fishing. A dozen or more are flying, on heavy, flagging wing, over the sea, the long neck doubled on the back, so that the beak seems to protrude from the breast. Suddenly, a little ruffling of the water arrests their attention; and, with wings half-closed, down each plunges with a resounding splash, and in an instant emerges to the surface with a fish. The beak is held aloft, a snap or two is made, the huge pouch is seen for a moment distended, then collapses as before; and heavily the bird rises to wing, and again beats over the surface with its fellows. It is worthy of observation that the pelican invariably performs a somerset under the surface; for descending, as he always does, diagonally, not perpendicularly, the head emerges looking in the opposite direction to that in which it was looking before. When the morning appetite is sated, they sit calmly on the heaving surface, looking much like a miniature fleet.

"In the evening, as I have stated, we see them pursuing their laborious course to repose. Standing at the door of Bluefields, which, from a slight elevation, commands a wide prospect of the beautiful bay, I have often watched in the evening, while the

sun, sinking among his gilded piles and peaks of cloud on the horizon-sea, leaves the air refreshingly cool and balmy, while the dying sea-breeze scarcely avails to break the glassy reflection of the surface,—the straggling flocks of pelicans, from a dozen to forty or fifty, passing slowly along over the shore. On such occasions, they manifest a decided tendency to form long continuous strings, like ducks. When the flocks are beating for fish, or sailing round and round on the watch, there is no such arrangement, but all circle in a confusion equal to that of the planets of the Ptolemaic system. Yet at any time of the day, in taking a lengthened flight, whether shifting their locality, or slowly sweeping over the sea, they usually take a lineal order.

“In flying thus in lines, I have been struck with the unity which they manifest in their motions: the flight is performed by alternate intervals of heavy flappings, and sailing on outstretched motionless wing; and the resumption or suspension of the one or the other state is regulated by the leading bird of the line. For example, the first begins to flap; in an instant the second begins, then the third, then the fourth, and so on, with perfect regularity of succession; and neither ceases till the first does, and then only each in his own turn. That this does not depend on the period of each motion being constant, is shown by the fact, that the duration of either state is very varying and arbitrary. If a bird be following the same course, near at hand, but not within the line, he does not regard the succession at all, but governs his own motion.

“The pelican, on alighting on the water to swim, brings his feet, which before had been stretched out behind, into a standing position, and, as it were, *slides along the surface* for several yards before he swims.”—p. 410.

The Booby (Sula parva).—“The sympathy shown by gregarious birds for their wounded companions is usually never more strongly manifested than in the boobies. In the wanton sport of shooting at them, when sailing past the kays and islets they resort to, there are few who have not witnessed the extraordinary efforts made by the clamorous flock to assist a wounded bird, when fluttering in the water, and unable to regain the wing. An accident which happened to one of the two boobies we have in our yard, gave us an opportunity of seeing traits of this feeling and of its attendant emotions. My little nephew, in chasing with a small whip one of our birds, entangled the lash about its wing, and snapped the arm-bone. The one bird not alone showed sympathy for the other, but exhibited curiosity about the nature and character of the accident. Our two birds are male and female. The wounded booby withdrew into a lonely part of the yard, and stood there drooping. The female sought him as soon as she heard his cry of agony, and after ascertaining, by surveying him all round, that the injury was in the wing, proceeded to prevail on him to move the limb, that she might see whether he was really disabled beyond the power of using it for flight. After a quacking *honk* or two, as a call to do something required of him, the female stretched out one of her wings;—the wounded male imitated her, and, making an effort, moved out, in some sort of way, the wounded member to its full length. He was now required by a corresponding movement to raise it:—he raised the broken arm, but the wing could not be elevated. The curiosity of the female was at a stand-still. After a moment's pause, her wounded companion was persuaded to make another trial at imitation, and to give the wings some three or four good flaps. He followed the given signal, gave the required beats on the air with so thorough a good will, to meet the wishes of his curious mate, that he twirled the broken wing quite round, and turned it inside out. The mischief was prodigiously increased. It was now necessary

to put a stop to this process of investigation of the one bird into the misfortune of the other. I came in just as these exhibitions had occurred, and taking up the bird with its twisted wing, I was obliged, after setting the limb, to restrain him from any further gratification of his mate's curiosity, by tying the wing into place, and keeping it so tied till the bone united. The one now attended the other, and carefully examined day after day the broken limb. Calling on him to make an occasional effort to raise the disabled and immoveable member, she used her ineffectual endeavours to persuade him to lift it, though tied, by lifting her own from time to time.

"Though this fellow-feeling was so strongly and so remarkably manifested with regard to the broken wing,—when feeding together, the abler female did not hesitate to take advantage of her greater agility, by snatching away from her mate his share of victuals, and grappling with him for one and the same piece of meat. Instinct seems to exhibit simple, not complex emotions. If the male bird had been utterly unable to feed himself, the female would possibly herself have supplied him with food:—but able to eat, the undivided passion was the feeding appetite; and the instinctive habit of striking at the prey, and grabbing it, was not capable of restraint, or of any modification whatever."—p. 418.

Notice of Ornithological and other Occurrences, in Norfolk, for the Month of June, 1847.

An example of the whiskered tern, a bird not previously recorded to have been obtained in Norfolk, was shot on the 17th instant, whilst flying high over Hickling Broad. It proved to be an adult female, and contained ova in an advanced stage; the largest being apparently almost ready to receive the shell. In the stomach were found the remains of about twenty of the larvæ of the broad-bodied dragon-fly.

The very unusually late occurrence of the common pochard, a male specimen of which was obtained during the first week of this month, has been kindly communicated to us by Mr. Bird, of Verulam Buildings, Gray's Inn, in whose possession the bird remains.

The following instances of the carnivorous propensities of the jackdaw have lately come under our observation. One of these birds was shot by a gamekeeper from the nest of a missel thrush, whilst in the act of devouring one of the young birds: another was observed in pursuit of a young pheasant; the latter soon squatted, when the jackdaw hopped upon, and immediately began to peck it, but was shot before he had done any further mischief.

A pair of kestrels have chosen in the hollow of the trunk of an old pollard oak, an unusual locality for their nests. It contained six young kestrels, and there were also found in it the remains of moles, mice, small birds, and a young partridge.

A Muscovy drake was a few days ago detected in the act of stealing and swallowing the fish which had been placed in a tub for a tame heron; and was found to have previously indulged in this rather curious habit.

We are indebted to a correspondent in the vicinity of Cromer for the following anecdotes. A squirrel, having been observed to be eating something of a whitish colour, the remains of his repast were examined, when it appeared that he had scooped out and devoured the inner part of a mushroom-shaped fungus; a production which we did not before know to have been made use of by this animal for food.

A gentleman, who about a fortnight ago was descending the Lighthouse Hill, near Cromer, between eight and nine o'clock in the evening, heard before him a sound which he describes as resembling the whirring of the nightjar. The noise increased as he advanced, and appeared to come from a wall which adjoins a neighbouring pond; and upon looking over the former "I perceived," to use the words of our informant, "three toads, sitting upon a stone with their mouths wide open, lifting up their voices in very tolerable melody. I watched them for about a minute, then they caught sight of me, turned bashful, and stopped their chaunt."—*J. H. Gurney, William R. Fisher; June 30th, 1847.*

Is the Edible Frog a true Native of Britain?—As the 'Zoologist' has been the means through which the discovery of the edible frog in England was announced to the world, it ought also to be the means of reminding the less cautious class of naturalists, that this finding the edible frog in one very confined locality is by no means to be considered proof of its being a native.

True, Foulmire is a very peculiar spot; situated some miles to the south of Cambridge on the very limit of the county, and surrounded by rising ground, the Cam, a branch of which takes its rise here, is its only connexion with the real "Fens." The nature of Foulmire differs from that of all other fens I have seen, in having the continuity of the vegetable substance or turf of which it is composed interrupted by frequent wells or pits of pure water, the bottom of which is kept clean by the rising of springs in the sand beneath, though in others of these pits, and those generally the largest, the rise of water is not sufficiently rapid to prevent black mud accumulating at the bottom, which in some serves as a pabulum for large water plants. Till lately, on one side the rising ground was a sandy heath, which, if I have been rightly informed, was inhabited by the natterjack, and I have seen this reptile in the sands of Gamlingay, which is no very great distance off. The common frog and the common toad are abundant in the fen, so also the warty newt, and perhaps, though I have no special remembrance of it, the common newt also.

It is then a peculiar, and in some degree, an isolated fen, but it is certain, if the edible frogs are aboriginal here, that in the course of ages the river must have carried some into the true fens, through the very centre of which it flows for several score miles; and can we suppose that they would not increase and flourish there, as well as in the neighbourhood of Kingsbury, where Mr. Bond informs me he has several very thriving colonies? This last fact shows that they can live and increase in England elsewhere than at Foulmire; and the rapidity with which they have spread themselves near Kingsbury does not point to any very distant period of time for their introduction to Foulmire. That they do not exist, at least in any plenty, in the true fens, is, I think, rendered highly probable by their never having attracted the attention of any naturalist there; certainly in my own rambles in the fens I have not seen anything like them. I say *never*, but I ought to qualify the expression by mentioning that Mr. Bond tells me he has lately heard of them there, of which I hope we shall learn further particulars. But that it is not very easy to find, even where most abundant, is shown by the fact, that though I have twice been to Foulmire, in March or April, for the express purpose of finding it, I did not meet with a single specimen; it was I suppose rather too early in the year; the common frog had spawned, and indeed,

there were some young tadpoles, toads were croaking about, and were to be seen in plenty in their usual galvanic postures at the bottom of the little river; if my memory does not fail me, I also found some of their necklace-like spawn. I fished up, perhaps, nearly a dozen frogs in a landing-net, of various ages, and also some warty newts, in the pools, but alas! nothing at all eatable! And on both occasions I trudged back to Trinity in utter disappointment, and undined. My good old friend Tom Rawlinson was with me the second time, with cans, nets, &c., and he rather relieved the monotony of the journey home, by showing me the bank of an orchard on which the great white snail abounded, which, as he informed me, with eyes wide open, he had seen either gipsies or Italians, I forget which, eat. Tom is knowing in such matters, he is "Tom the pieman" of all the "feasts" many miles round Cambridge:—an old soldier, a reformed drunkard, a teetotaller, an affectionate father, a simple-hearted fellow, a collector of insects, eggs, fossils, and everything else, and a protégé of "Perfesser Sedgwick." His personal appearance I should spoil by description,—I liked Old Tom! But to return to the snails, the *Helix Pomatia* of some nomenclature, they are, if I mistake not, believed by conchologists to have been originally introduced from the continent, perhaps by Roman monks; may not the frogs have been introduced to eat with them by the same Italians? Or may not gipsies or organ boys have brought them over more recently? Or in very modern times may not some have accidentally escaped from confinement, or been intentionally turned out by naturalists? Do I not remember an account of a large number of them being in the possession of Mr. Gray, of the British Museum, and may not some of these have strayed into Cambridgeshire? I am only imagining possibilities, but possibilities which seem to myself more probable than that the edible frog should be a native of Britain, and yet confined to Foulmire. It is a matter of some interest in the consideration of the geographical distribution of reptiles.

It is much to be regretted that Foulmire, as I hear from Mr. Bond, is drained! But he tells me he expects the frogs will disperse, and not become extinct. As he informs us that the frogs of Foulmire are well known, and have a name given them in the neighbourhood, it would be very interesting if he, or some one at Cambridge, would make inquiries as to whether there is any tradition of their first appearance at Foulmire.—*J. Wolley; May 3rd, 1847.*

Notes on the Fishes in the District of the Land's End.

By R. Q. COUCH, M.R.C.S.L., &c.

Continued from page 1714.

Common Cod, *Morrhua vulgaris*. Common on all parts of the coast, especially on sandy banks, and the rough ground in sheltered bays. This fish is very voracious, and not at all particular in the quality or character of its food. It constantly feeds on Crustacea, and is perhaps fonder of it than of any other, but any dead animal matter is greedily devoured. They feed near or on the ground, and

prowl about, rather than actively pursue any prey. From the great extent to which the net-fisheries are carried in the west of Cornwall, the hook and line occupation is all but destroyed; but it would well repay any fisherman to re-establish it. The sandbanks off St. Ives, Cape Cornwall, and all the deep sea round to Mount's Bay, possess vast swarms of cod, and when railway communications are established with the larger markets these localities will no doubt be well fished. It spawns about March and April, and the size to which the roe attains is sometimes very great; in one case, where the fish weighed twenty-one pounds, the roe was twelve. The cod varies much in colour; those caught on a sandy soil are light, while those from a rocky or weedy ground are darker, and frequently of a coppery-brown colour. It does not appear to depend so much on the character of the food as is commonly said to be the case, as on the colour of the ground. I have seen a young or Tamlin cod, and a bass of a very dark hue, turn pale and continue so, after being placed in a pool composed chiefly of quartz rock. The young or Tamlin cod approaches the shore in the summer and autumn, and may frequently be caught by angling from the rocks.

Haddock, *M. æglefinus*. Common; spawns about March. Like the cod, it is a ground feeder, but has not so ravenous an appetite. It appears to feel the effect of hunger more than any of its kindred species, and rarely, if ever, appears in a very sleek state. Though liked as an article of diet by many, yet the flesh has generally a very dry and hard texture.

Bib, *M. lusca*, Pout. Common, on all parts of the shores. During the winter it lives in deep water, but during the summer and spring approaches the shores. It prefers rough ground, or such localities, where shelving rocks rise out of a sandy soil. It feeds on minute Crustacea and small fish. In the autumn, the young are frequently caught by boys angling from the rocks. It is a very soft fish, and rapidly decomposes, or more correctly speaking, becomes pulpy and unfit for use. It breeds early in the summer. This fish is frequently marked with broad, longitudinal bands, alternately light and dark; these are sometimes very well marked, at others they are only faintly discernible, but in death they generally disappear. This banding is similar to what is observed in the pilot fish.

Power, *M. minuta*, Bibben pout. This species resembles the last in every particular, except that it is not so deep. Its habits are the same.

Whiting, *Merlangus vulgaris*. Common.

Poutassou Whiting, *M. poutassou*. Very rare. I never saw but one specimen, and that was taken by a fisherman of Polperro. It is described and figured in the second edition of 'British Fishes,' but the figure is too dark.

Rauning Pollack, *M. carbonarius*, Rauner. Common during the winter and spring, when they appear to be gregarious; they are not so, however, in reality. It is a habit of this fish to reside in strong currents, from which they shelter themselves by keeping behind large rocks. In such a situation, they sometimes congregate in large companies, with their heads turned in the direction of the stream. Any food, whether living or dead, that is carried past them, is seized as soon as seen; and thus they are perpetually darting from and returning to their hiding place. When not frequenting such haunts they wander alone. If a fisherman takes one, there is a prospect of taking many more, and I have known eighteen hundred weight taken by one boat at one time. During the quiet weather of autumn, they approach the shore, and swim very leisurely from spot to spot, but they invariably pounce upon their prey in the most violent manner, and devour it with greediness. They spawn in spring.

Hake, *Merlucius vulgaris*. Always common, and during the autumn abundant. It is very ravenous and is a great vagrant. In the winter it is taken with a hook and line, or with the trawl in deep water; as summer approaches it comes into shallower bays. It is very uncertain in its movements, for during one night not a single specimen will be taken, while during the next the supply seems almost unlimited. It is not a gregarious fish, but during the season when the pilchards approach the shore, the hakes accompany them in vast multitudes. They so constantly attend on the shoals of pilchards, that the migrations of one may be described as the wanderings of the other. But the movements of the pilchard are the results of natural habits and instinct, apparently independent of external circumstances; but all the wanderings of the hake seem to be the result of insatiable appetite. If the fishermen are successful in the taking of the hake, they know the pilchard is not far off, though it may be swimming near the ground. I have known a man with a pair of lines, each with two hooks, take eighteen dozen in one night, besides attending to the drift-nets for the pilchard. There is scarcely an enclosure of pilchards, except the great ones at St. Ives in the winter, without great quantities of hake being also taken. In such situations they frequently gorge themselves to such an extent as to be quite helpless; I have seen, on many occasions, from eight to twelve pilchards

taken from the stomach of a single fish, and sometimes so many as seventeen closely packed together. But it very rarely occurs that a hake taken with a line has this gorged character; this arises from a peculiar habit it has of ejecting the contents of the stomach in attempting to escape. It breeds very early in the year, from January to March, and the young very rarely take a bait, though they feed on the living pilchard. The outline of the hake varies very much. The head in some species seems elongated, and the dorsal and abdominal fins are waved and lobulated; but the figure in Mr. Yarrell's first edition of his 'Fishes' is very characteristic of the general appearance.

Ling, *Lota molva*. Common. Scilly has long been celebrated for its dry ling, and it may perhaps derive its name from Zilli, being the Cornish name of this fish, though it is sometimes made to include the cod also. It is a ground fish, and swims stealthily about the rocky declivities of the sea. It prefers for its habitation deep marine valleys, with overhanging ledges, and deep and circumscribed caverns, in which the fishermen think it breeds. When these caverns or valleys become densely inhabited by them, they migrate in large shoals to other situations; such is the opinion of those engaged in the fishery, but whether the reason given be correct or not, every three or four years they are caught more abundantly than common, and in unusual situations. They feed on living food generally, and are especially fond of Crustacea.

Whistler, Three-bearded Rockling, *Motella vulgaris*. Common in shallow water, in rocky gullies, living among the ledges of the rocks near the ground. It is called whistler only in the west of Cornwall.

Brown Whistler, Five-bearded Rockling, *M. quinquecerrata*. Occasionally found about low-water mark in Mount's Bay.

Midgen, Mackerel Midge, *M. glauca*. This beautiful little fish is very uncertain in its appearance; for some seasons a few only can be seen, and again in others they appear in countless multitudes. In March and April they may be seen in the deep sea, in scattered flocks, floating or swimming at the surface, and scattered through the foam of the waves. Towards May and June they associate in larger companies and approach the shores. Like the pilchard, it migrates from deep water in large schulls, while during winter they live singly in deep water. When they approach the shores the numbers seem astonishingly large; and if it should be boisterous weather, all the inlets of the coasts and all the pools seem filled with the dying and

the dead. While at the surface, they eagerly seek the shelter of any floating object, and hence are destroyed by the buoys of nets, or in the taking of sea-weed.

In its characters it undoubtedly belongs to *Motella*, and especially in the delicate membranous and vibratory character of the first dorsal fin and the ciliated appendages to the jaws; but in its habits it seems to be totally different. Unlike the other species of this genus, it is a high swimmer, never protecting itself beneath stones near the shore; and it appears to be not a ground feeder, in the same sense as its congeners; and, unlike them, is instantly destroyed on being taken from the water, so that with the configuration of a *Motella* it has the habits of a *Clupea*.

Hake's Dame, *Phycis furcatus*. Common during the autumnal and winter months. I have seen five specimens at one time exposed for sale in the fish-market of Penzance, and during the last autumn scarcely a week passed in which several were not trawled up. It prefers a sandy and muddy bottom.

Lesser Forkbeard, Tommy Noddy, *Raniceps trifurcatus*. I have obtained several specimens of this fish in Mount's Bay, from the trawlers. In some specimens there are tubercles, posterior to the pectoral fins, which in others are not observable till the animal has been out of water for some hours. All possess them, but they are not equally visible in each. It spawns in July.

FLAT-FISHES.

Plaice, *Platessa vulgaris*. Common. Though these notes are intended only to refer to the habits and migrations of fish on the western shores of Cornwall, yet they do not entirely preclude an occasional reference to other particulars. All the flat-fish, whether Pleuronectidæ or Raiidæ, have a very remarkable development of the iris. In the race about to be described, the superior and middle portion of the iris forms a rounded prolongation, which hangs as a curtain over the pupillary aperture. In some specimens it is more apparent than in others, depending on the localities and depth of water in which they have been taken. The iris in the Pleuronectidæ, as well as sharks and rays, has a distinct action. In the turbot, as well as in the sharks, &c., I have on many occasions watched the movements, and measured the pupillary aperture. In the rays, the curtain is very peculiar, being developed into a serrated festoon. This serration is so great, that the blind may be said to resemble a glove with spread

fingers ; this also varies in size, and has motion. In the sharks, the pupillary aperture is irregular, being sometimes round, at others perpendicularly oval, and in some transversely so. But the length of the pupil is generally, if not always, in the direction of the tapetum.

Flounder Lantern, *P. flossus*. Common in sandy and muddy spots. It ascends rivers into fresh water, where the tide never reaches.

Dab, Fleuke, *P. limanda*. Common.

Mary, Sole, *P. microcephalus*. Not uncommonly caught by the trawl : it is but little esteemed as food. It occurs in Mount's Bay, Whitsand Bay, Land's End, and St. Ives' Bay. Spawns in June.

Holibut, *Hippoglossus vulgaris*. Not uncommon off the Land's End. It is the largest of all the "flat-fishes," but I have never seen it on the Cornish shores of the size it attains in the North of England. Mr. Yarrell describes it as attaining "near five hundred pounds," while the largest specimen I ever saw was one hundred and twenty-two pounds, and this was considered by the fishermen as a large specimen. It feeds on Crustacea, and prefers stony ground to all others. It breeds about April.

Turbot, *Rhombus maximus*. Common, in particular localities. I have known eighteen taken at one time on a "boulter" or long line. They frequent sandy bays, and frequently change their habitats. It is daily taken on some parts of the shores between St. Ives and Mount's Bay ; but there is no regular fishery for it.

Brill, Kit, *R. vulgaris*. Common.

Müller's Topknot, Rough Brill, Brownny, *R. hirtus*. Not uncommon. The habits of this fish differ very remarkably from any of its kindred species. They frequent sandy bays and inlets ; this, the rough ground bordering such localities. It prefers low, shelving rocks, with ledges, covered with sea-weed, and hence is frequently taken in the trammels or nets set for the sur-mullet. It breeds in the summer and autumn, and in winter the young are of about one or two inches in length, and may occasionally be found under stones at low ter mark. The brill and the topknot appear to be liable to frequent malformations about the dorsal fin. Frequently the anterior portion is developed into an arch, which rises over the eyes ; the posterior portion is liable to the same prolongation, and the first three or four dorsal rays are frequently prolonged into membranous tendrils.

Carter, Lantern, *R. megastoma*. Very common, being abundant in all our sandy bays ; it is but little valued as an article of diet. If

caught in roughish ground it is occasionally mottled on the dorsal surface.

Megrim, *R. Arnoglossus*. This fish is frequently taken in our trawls, and always presents the appearance of having been dipped in scalding water, and hence it has been called "scaldfish." I have seen several measuring seven inches in length, but its most common size is about five. The skin is very thin, and is readily rubbed off, but the scalded appearance is natural to it.

Sole, *Solea vulgaris*. Everywhere common.

Variegated Sole, *Monochirus linguatulus*. Several examples of this sole have been taken at Lamorna, in Mount's Bay, and at St. Ives.

Cornish Sucker, *Lepidogaster Cornubiensis*. Very common in pools under stones, between tide-marks. It is a pretty species, and firmly attaches itself to stones by its pectoral sucker. It is very tenacious of life. It is very inactive, and when very much disturbed, its chief activity consists of a mere wriggle to get rid of, or to remove from the source of its annoyance. It is diffused throughout the Cornish shores. It spawns about April.

Bimaculated Sucker, Cornish Sucker, *L. bimaculatus*. In general configuration, this species very much resembles the last, but is easily distinguished from it, by the absence of the large ocellated spots behind the eyes, and the smaller size of the dorsal fin. This is said not to be so common as the last, but this arises from its living in deeper water, and not from any scarcity of specimens. It is always found nearer low-water mark spring-tides than at any other spot.

Lump Sucker, Lumper, *Cyclopterus lumpus*. This remarkable looking fish is not uncommon in particular localities. Its body being very deep for its length, as well as very thick, and the very fleshy, or fat appearance, being continued even to the edges of the fins, together with its small mouth surrounded by its full cheeks, gives this species the grotesque appearance of an over-fed, self-satisfied glutton. It is very inactive, adhering firmly to the stones or rocks; it rarely moves; except for the purpose of feeding. It varies in colour, from a deep neutral tint to a yellowish carmine, depending on age and the character of its feeding ground.

Montagu's Sucker, *C. Montagui*. Common, but not abundant. Unlike the others of the genus, it is rather active, and rarely makes use of its suckers, unless in a stream, or anything that seems likely to push it aside.

Eel, Sharp-nosed Eel, *Anguilla acutirostris*. Common, in streams, and at the conflux of the fresh and salt water. It prefers a muddy, or a sandy soil. The young ascend the rivers in countless multitudes in March and April, and remain there during the summer. At first they are translucent, and allow all the abdominal and thoracic viscera distinctly to be seen. The skin becomes gradually opaque, and finally black. They frequently, both old and young, bury themselves in the mud, and in cold weather will remain there for days without coming to the surface. From the obstruction to respiration such a retreat must produce, and the great tenacity of life possessed by these creatures, the views of Dr. M. Hall, that the quantity of respiration is in the inverse ratio of the irritability, seem fully confirmed. All the eel tribe are very susceptible of atmospheric changes; cold drives them to their shelters, and thunder-storms make them exceedingly restless. But while they avoid the cold, they are able to bear it to a very low degree. The young of the spring rapidly increase in size, and acquire a greenish-brown colour by May and June. When they have attained a size, varying from four to seven or eight inches in length, they are called "whuffers" or "whiffers," I suppose from their being used for the capture of pollack and mackerel in the fishery called "whiffing," and for which the lamprey is also used. In the autumn, and sometimes in the summer, they again descend the rivers into brackish water; whether because the change is agreeable to themselves, or because the function of spawning demands it, is not quite a settled point; but that they do descend at that period, there is no doubt, and that they will even overcome formidable obstacles in their course to effect it, is equally certain. The spring migration, from being in such multitudes, is the one most observed. The young force their way wherever there is fresh water pouring into the sea. I have known them ascend a small stream for a short distance, when they have been obstructed by a waterfall of about twenty feet high; and yet on examining the wet moss on the rocks over which the water fell, the eels may be found tortuously winding their way to the stream above. If a stream, from the dryness of the summer, be reduced in size, the eels will quit it and travel through the wet grass in search of another. I have kept eels in confinement, in large basins, but they have generally effected their escape by night, which is their favourite time for moving. Their mode of escaping is remarkable; they commence by throwing their tail over the edge of the vessel, and that organ being a prehensile one, they then lift themselves over, and so escape by their usual tortuous motion. The tail is a very power-

ful organ with all the eels, and, in fact, with all the fish that burrow in the sand or mud. The large eels rarely ascend the streams beyond the reach of sea-water; their most favourite haunts are about the crevices of quays, amidst large stones, and in the mud. The eels are oviparous. I have never been successful in obtaining an eel just ready to shed its spawn; but if the fat substance on each side be examined under a microscope, the small granular ova may be observed in some cases. Last summer I took a quantity of mud from a spot much frequented by eels, and carefully examined it to see if there were any in it, and, after testing several specimens without success; I was at last gratified by observing the eels, small and transparent, lying on the surface almost motionless. They rapidly grew, and in ten days acquired strength and size to swim about. And after examining a great many congers, I have had the good fortune to see three specimens, in which the roe were as fully developed as ever I saw them in a cod, and just ready for shedding, and yet the young were not visible. The development of the ova appears to be at first very slow, and much influenced by changes of temperature, and hence they are enveloped in large quantities of fat. Finally, however, the growth seems to be very rapid and the shedding quick; or how could it happen that so few perfect roe are seen even by the fishermen?

Broad-nosed Eel, *A. latirostris*. Occasionally found at Hayle.

Snig Eel, *A. mediorostris*. Not uncommon.

Conger, *Conger vulgaris*. Everywhere abundant; but they prefer deep water with a rough and rocky bottom, and sandy patches surrounded by high and overhanging rocks covered with sea-weed. They feed chiefly by night, and prefer the darkest. They feed on the large Crustacea, pilchard, cuttle, &c., but the cuttle is the favourite bait of the fishermen. They retire to crevices and hollows in the rocks, and burrow in the sand; and in these hiding-places they are sometimes left by the receding tide. When hid among rocks, it is sometimes difficult to move them, from the immense power they possess of grasping with their caudal extremity, in which is a small pulsating cavity, which is no doubt the cause of the power. The quantities taken are immense; a single boat will sometimes land sixteen hundred weight at a time, and though not held in much estimation as an article of diet, yet they always command a good sale at low prices. They are purchased chiefly by the poor, and by the neighbouring farmers. They are not so abundant now as formerly, from the trawlers destroying the breeding-grounds. They sometimes attain a very large size; the largest I ever saw weighed 92lbs., but I have seen

several varying from 84 to 72lbs., and those from 30 to 60lbs. are common. Breeds in the depth of winter, and hence the use of the fat surrounding the ova. I have seen cases, though they are rare, in which the ova have been as large as small peas. This rarity must arise from the rapidity with which they are at last developed and shed, after arriving at a certain age. Those fish living on dark, rocky ground, are nearly black in colour, while those living on sandy ground are of a pale brown.

Muræna, *Muræna Helena*. This is not a Mount's Bay fish, but I have seen a specimen taken at Polperro, and this is figured and described by Mr. Yarrell in the 'British Fishes.'

Morris, *Leptocephalus*, *Morrisii*. So frequently taken, that it cannot be uncommon in deep water.

R. Q. COUCH.

Penzance.

*Seventeenth Meeting of the British Association for the Advancement of Science.**

The PRESIDENT, in opening the meeting, drew attention to the number of distinguished foreign naturalists present; and also to the Museum in which they were assembled, being one of the oldest in Great Britain, and containing specimens of great interest in connection with the writings of our early naturalists.

Mr. J. E. GRAY gave an account of two new species of Cetacea. The author stated that our present knowledge of the Cetacea was imperfect; as few points of generic or specific value had been noted in the descriptions and drawings of the various whales that had been found in different parts. He believed that a greater number of species would be found to exist were this point inquired into. Even with regard to the whale that furnished whalebone, those artisans who worked in it knew that the whalebone from Greenland was a much better article than that from the Cape or from the South Seas; and yet no distinction existed among naturalists, as to the species which produced this whalebone. He believed, from a comparison of the structure of the vertebræ of the whale now in the Ashmolean Museum with one in the British Museum, that a specific difference existed, although they were thought to belong to the same species. He concluded by describing as two distinct species, two whales which had been originally separated by Sibbald, but afterwards united by Cuvier, under the names of *Balænophoca Sibbaldii*, and *B. antiquorum*.

In answer to a question from Dr. DUNCAN, Mr. GRAY stated that he could identify four species of British Cetacea, besides those described—*Balæna mystacetus*, *Physeter Boops*, *P. musculus*, and *Megapteryx longimana*.—The PRINCE of CANINO objected to the use made by Mr. Gray of old names applied to new species as likely to mislead. It would be better to leave the old names unused than to apply them to new species.—Mr. GRAY stated that many species of whales might be known by the parasites which inhabited their bodies. He believed it impossible for the whales of the South Seas to cross to the North Seas.—The Rev. Dr. SCORESBY stated that the distribution

* Extracted from the Athenæum of July 3rd and 10th, 1847.

of whales was determined by their food. Whales travelled slowly—at quickest certainly not more than six or eight miles an hour. The young differed in appearance from the old ones, which might account for the want of an accurate knowledge of their external character.

Dr. MELVILLE read a paper 'On the whale *Ziphius Sowerbii*.' For a long time it was supposed that the only specimen of this animal existed in the Ashmolean Museum. From an examination of this specimen, the author regarded it as an example of the male of the *Delphinus micropterus*, and not as belonging to the extinct genus *Ziphius*.

Mr. GRAY thought the reasons of Dr. Melville not sufficient to place this animal in the genus *Delphinus*, and on that account would still prefer leaving it in the genus *Ziphius*.—Prof. OWEN concurred in the view taken by Dr. Melville, and believed it to be most philosophical to regard this animal as the male of the *Delphinus micropterus*.

Mr. W. THOMPSON, 'On Additions to the Fauna of Ireland.'—The additional species brought forward were about fifty in number, chiefly invertebrate animals.

The PRINCE of CANINO observed on the great interest of the Natural History of Ireland on account of its contiguity to the Continent.

Mr. BUSK read a paper, 'On the Application of the Gutta Percha to Modelling.' After alluding to his experiments, he described the mode he followed in obtaining his moulds:—"It is to be rolled out on a smooth surface in sheets of any convenient size suitable to the object to be taken, and varying in thickness according to the size. For small objects, from the $\frac{1}{12}$ to $\frac{1}{16}$ of an inch is thick enough. The sheet is dipped for a moment or two into *boiling* water, and placed warm upon the object, upon the surface of which it is to be carefully pressed with the finger point, or a convenient elastic pad, so as to insure its close and uniform adaptation. In moulding soft objects it is, of course, necessary that they should possess elasticity or resiliency, as in the case with living or recently dead animal bodies. The gutta percha does not seem to be applicable to taking moulds from very fragile bodies,—such as many fossils, which would not bear the requisite pressure nor admit of the removal of the mould when rigid without risk. The most delicate objects, however, and slender projections, if firm enough in the original, may in the plaster-cast be removed from the matrix without any difficulty when the latter is softened by momentary immersion in hot water.

Mr. JERDAN stated that there were two kinds of gutta percha—one white, the other black. The former was the best for modelling. He had written to Mr. Brooke, of Borneo, on the subject, who informed him that an unlimited supply might be obtained from that country.—Mr. CRAWFORD said it was not hard till after it was submitted to the heat of boiling water. The proper way of pronouncing the word was gutta pertsha, which was a Malay term, and signified ragged gum.

The PRINCE of CANINO read a paper 'On four new Species of Bat.' One, a new genus, he dedicated to the President of the Association, under the name of *Inglisius rhedycinus*. The genus is closely allied to *Anoura*. The remaining new species were *Anoura Bourcierii*, *Molossus Delatrei*, and *Arcibeus Floresii*.

The PRINCE of CANINO made some general remarks on the classification of Mammalia; more especially in reference to Prof. Owen's views of the connexion between the Pachydermata and Ruminantia. He was sure he only expressed the feelings of a great many continental naturalists when he said that he was sorry Prof. Owen had come to this conclusion; although, if truth compelled him to give up the old order

Ruminantia he would do so. So strong were the characters which connected together this order, that Illiger thought it might even be reduced to a genus.

Prof. VAN DER HÖVEN stated that the peculiar character of the stomach, the general form of the skeleton, the form of the condyles of the jaw, and the nature of the teeth seemed to connect the Ruminantia so strongly together as to render their fusion with any other order almost impossible.

Prof. OWEN remarked that if we confined our attention to existing forms of animals, we might arrive at the conclusion of Prof. Van der Höven; but it was when we studied extinct forms that we saw our ground giving way. He then pointed out the fact, that in the Camelidæ and Moschidæ there was a departure from the normal type of the stomach in Ruminantia, approaching, in fact, the character of that of the Pecora. Although the number and character of the teeth in the adult forms of Ruminantia differed from those of the Pachydermata, yet when we examined the young of many of the Ruminantia we found there a departure from the adult type, and an approach to that of Pachydermata. Again, Cuvier had placed the fossil genus Anoplotherium amongst Pachydermata on account of its divided or double cannon bone; but even this character had been observed by Dr. Falconer in the Ruminantia in a species of Moschus.

Dr. LANKESTER read a list of dates of the periodical appearance of birds at Llanrwst, observed by John Blackwall, Esq.; and called attention to the importance of such lists, in connexion with meteorological registers, in determining the influence of external agents on the periodic phenomena of organization.

Dr. A. G. MELVILLE, on a careful examination of the *Lepidosiren annectens*, had come to a different conclusion from that held by Prof. Owen on the position of this anomalous animal in the sub-kingdom Vertebrata. He had no hesitation in referring it to the class of Amphibia, and was unwilling to limit that class to the closely allied one of Fishes. He rested its reptilian character upon the absence of the supra-occipital bone, the presence of the large epi- and basi-cranial bones, the non-development of the maxillary and inter-maxillary bones, and especially on the enormous magnitude of the Wernerian bones which became subservient to mastication and were ankylosed to the expanded pterygoids: also on the composition of the tympanian pedicle: on the nostril being doubled and the posterior aperture intra-oral—and referred to Rusconi's remarks on the position of that aperture as influenced by the relative development of the superior maxilla and vomer: on the double auricle, septum ventriculorum, semi-spiral bulbus arteriosus, and on the arrangement of the vessels distributed to the external and internal gills and to the lungs; and in addition to the left pulmonary artery pointed out by Peters, he had found a right one, having, like its fellow, its origin from the truncus aortæ: on the existence of external cutaneous gills during the adult condition, which did not occur in any fish, and were not the homologues of the deciduous filaments found in sharks and rays: on the co-existence of external and internal gills with lungs—in other words, on its exhibiting the different modes of circulation, respiration, &c., in the *Proteus*—second stage of the larva of the frog and *Amphiuma* or *Menopoma*—(he instanced the like case of the tadpole, of the *Rana paradoxa*, in which there were internal gills and lungs with a cartilaginous chorda dorsalis, ossified neurapophysis, and protruded hinder extremities; were this arrested in its development before the external gills have wholly disappeared, we should have an animal essentially similar to the *Lepidosiren*): on the form and relative size of the brain in relation to its containing cavity; and mentioned certain calcareous concretions

which overlie the fourth ventricle, &c., &c. Many of the peculiarities were to be classed among the adaptive characters;—and for some excellent remarks on this subject in reference to the osseous system in another tribe, to wit, the plagiostomous fish, he would refer to Mr. Owen's 'Lectures,' vol. ii. The absence of respiration by the surface, as in other Amphibia, might have an influence on the great development of the respiratory organs. In conclusion, although the *Lepidosiren* is the most fish-like of the Amphibia, still he is forced to regard it as a true amphibian, and not as a fish, and thus reverts to the determination of Bischoff.

The PRINCE of CANINO stated that although Oken had pointed out the nostril with two openings as a character of the Reptilia, he had received a letter from that naturalist, in which he declared his belief that the *Lepidosiren* was a fish and not a reptile, and that the double opening of the nostril was apparent and not real.

Prof. OWEN thought the mere possession of a double nostril would not be sufficient to place this animal with the reptiles. He, however, denied that this was the case. The scales of the *Lepidosiren* were those of a fish. The breathing-organs he deemed to have no more of the character of lungs than the organs possessed by many fishes which occasionally lived on land. The circulation was not decidedly reptile, and approached in character that seen in some of the plagiostomous fishes and the young of most fish. He did not think the size of blood-globules or the cells of the bone of sufficient importance to decide the class of *Lepidosiren*. Neither could a better case be made out for the heart or brain; in the structure of both of which organs there was an identical character with many fishes. The spiral character of intestine was certainly a good distinction as far as existing Reptilia; and he was not certain that the form of the coprolites of the *Ichthyosaurus* depended on this structure. From the osteological characters of the head he also concluded that the *Lepidosiren* was a fish and not a reptile.

A long and rather desultory discussion followed; in which the Prince of Canino, Prof. Milne-Edwards, Sir J. Richardson, Dr. Carpenter, Dr. Melville, and Mr. Hogg took part.—Mr. GIBSON, from America, offered to send to England living specimens of the American *Lepidosiren*. A wish was expressed that the naturalists present at the Association should not part without an opportunity of examining the structure of this animal; and Dr. Carpenter and Dr. Melville offered their specimens for the purpose. It was stated that Dr. Melville had been requested to draw up a report on the structure and affinities of the *Lepidosiren* for the next meeting of the Association.

Prof. ACLAND exhibited a specimen of a living *Proteus*, which—having compared with a specimen in the possession of Prof. Owen also placed on the table—he believed to be a new species. The two animals differed in colour, size, and the form of the gills, as well as in their habits; the one of Prof. Acland being much more active than that of Prof. Owen.

The PRESIDENT, in commencing the business of the section, drew attention to a project for erecting a statue to the memory of Geoffroy St. Hilaire, the philosophical anatomist of France, in his natal city of Etampes.

The Rev. L. JENYNS exhibited some specimens of wood which had been attacked by the larva of an insect called *Callidium Bajulus*. The external part presented little or no indication of the mischief which had gone on in the interior. This deceptive appearance had nearly cost an individual his life, as it formed a part of the beam of a church, and gave way on a workman setting his foot on it. The insect deposits

its eggs in the wood, and then when the larvæ are hatched they eat their way out.—Mr. SPENCE stated that other insects had the same habits. An insect, a species of *Anobium*, did great damage in the neighbourhood of Brussels.—Prof. ESMARK stated that the *Callidium Bajulus* was a rare insect in the eastern parts of Norway, but in the southern parts it was very common, and destructive to the timber of forests.

‘On the Structure of the Larva of certain Acari,’ by Prof. ALLMAN.—The author demonstrated in the six-legged larva of *Halarachne Halichoeri* (*Allm.*), a digestive canal which expands on either side into two great cœcal pouches. Two long cœca also may be seen opening into the rectum near its termination, and from this point may be traced forwards on each side till they enter the basal joints of the anterior pair of legs. A large nervous mass placed beneath the œsophagus was also pointed out, and the fourth or posterior pair of legs, which are afterwards to become developed, may be seen in a rudimental condition, confined as yet beneath the integument. No trace of tracheæ could be detected, though these are very evident in the adult, and the author was of opinion that the respiratory function does not become specialized till after the development of the fourth pair of legs.

Dr. ALLMAN also read a paper ‘On the Locomotive Larva of *Plumatella fruticosa*.’

A paper was also read by Dr. ALLMAN ‘On the Development of *Notodelphys*, (*Allm.*), a new genus of Entomostraca.’

Mr. L. REEVE stated that the common cowrie passed through the metamorphosis that Prof. Allman had mentioned in other Mollusca.—Mr. WESTWOOD drew attention to the development of the Crustacea, in which when young the representatives of the legs in the adult animal were shown by a series of eight moveable appendages round their jaws.—Dr. MELVILLE referred to the experiments of Sir John Dalyell and Mr. Goodsir, on the reproduction of the lost parts in various Crustacea.

Mr. WESTWOOD made some remarks on the existence of the potato-disease in Oxfordshire. Some potatoes of his own had been attacked this year, and in three different districts around Oxford he had observed its presence. As an entomologist, he wished to deny most distinctly that he thought the disease arose from the attacks of an insect. It had been stated by Mr. Smee that it arose from the attacks of a new *Aphis* which he called *vastator*, but this *Aphis*, far from being new, had been described many years ago and was a very common insect on decaying plants. Another gentleman proposed to call the insect *A. pestilens*. Mr. Westwood drew attention to the ignorance such observers displayed, as rendering it necessary that zoology should be taught as a branch of science. He was sorry to be speaking on this subject in an English University where neither zoology nor comparative anatomy were recognized as branches of education.

Mr. J. E. GRAY stated that he had compared some specimens of the *Aphis vastator* with species of *Aphides* in the British Museum, and found that under this name Mr. Smee had included three or four well-known species.—Dr. LANKESTER drew attention to a bundle of potato-stalks which he had brought from Pangbourne, which gave every sign of disease, but not an *Aphis* could be found upon them. One fact of this kind was sufficient to prove that the disease had no dependence upon the insect. He had heard from a gentleman in Manchester that potatoes sown in new soil on Chat Moss were free from the disease, whilst those sown in old soil all had the disease. This looked as if the inorganic constituents of the soil or potato were the source of the disease.—Mr. BABINGTON referred to the potato-stems from Pangbourne. He had ex-

amined the roots of these plants, and found that wherever the disease appeared in the leaves there was evidence of disease in the roots. He believed the root was first at fault. He quite agreed with Mr. Westwood in the necessity of a more general knowledge of Natural History.—Sir W. Jardine said, that chemical investigations of a very accurate nature, both of the soil and the potato, were being carried on in Edinburgh. He had found that potatoes grown on moss soil were more free from disease than others. This did not arise from the newness of the soil, for he had had some potatoes entirely spoiled which were planted in an orchard recently turned up. He had seen the stem and root very much affected without the leaves being diseased at all.—Mr. HOGAN called attention to a method he had pursued of preventing the disease in the potato by growing them from seed.—Mr. C. DARWIN had brought the seed of the potato from Peru, and the tubers grown from it were quite as much affected as any other.—Dr. KELAART stated that he had recently heard from Ceylon that the potatoes had been attacked in that island.—A MEMBER said that he had just received letters from New Zealand, and the potato was also affected there.—The Rev. N. YOUNG, of New College, exhibited some potato-leaves affected by the Aphis.

Mr. MURRAY communicated a paper ‘On the Vitality of Potato-Seeds,’ in which the seeds of the potato had remained fifteen years in the ground, and then when the soil was turned up they vegetated and produced a crop.

‘On the Structure of *Nautilus Pompilius*,’ by Prof. VAN DER HÖVEN, of Leyden.—My friend, De Vriese, lately gave me a specimen of *Nautilus Pompilius*, which was in a bad state of preservation; but still of great interest to me, as I found occasion to observe a conformation of the head quite distinct from that which has been described by Owen and Valenciennes. As to the external tentacula, I found only this very unimportant modification—that there were but nineteen at each side, instead of twenty. Internal to this part, whose upper or dorsal part, called hood by Owen, fills entirely the opening of the shell, the integument forms a prolongation, rising up to another more internal circle. To the ventral or inferior side, this prolongation unites by a transverse part with the external tentacular ring. This part shows many transverse impressions parallel to the margin, and many irregular excavations, which give to it a reticulated appearance. The prolongation is divided on each side into eight digitations of different size, enclosing each a tentacle similar to that of the internal set, but of a more minute size. Those parts correspond to the *superior labial processes* of Owen (‘Memoir on the Pearly Nautilus,’ Tab. iv. g. g.); but in Owen’s description, and also in that specimen which has been described by Valenciennes, there are many more tentacula—twelve in Owen’s specimen, and thirteen in that of Valenciennes. The last-named author calls this part the superior pair of the internal arms. Toward the inferior part of the head, nearer to the infundibulum, which is situated at the median ventral line, there are two other processes in Owen’s and Valenciennes’ specimens:—the inferior labial processes of the former—the inferior pair of the internal arms of the latter. Owen attributes, also, twelve tentacula to each of these processes. In this point my specimen is entirely different. On the right side I found four tentacula; three on a common flat pedunculus; the fourth and inferior on a separate digitation. I also cannot agree with Owen in calling these *inferior* labial processes—*interior* as they were in his specimen. In the specimen examined by me they were, on the contrary, more interior than the superior labial processes. But at the left side a still greater difference was to be observed. Instead of a labial process, there was a great conoid body compressed from each side: at the basis of its measure, from the

dorsal to the ventral surface, was one inch ten lines; from the right to the left only one inch. This part was proved, by dissecting it, to be formed by the union of four unusually developed tentacular slips; one of which was shorter and more free; the three others chiefly composed the singular body. This part occupied a great space in the interior of the tentacular circle of the head; and, perhaps, its great development may be the cause of the more imperfect state of the other three pair of labial processes.

Prof. OWEN regarded the observations of Prof. Van der Höven as of more importance than those of Valenciennes. The difference of number in the tentacles proved that there was a range of variation in this respect; and, therefore, not to be relied on. He had examined a second specimen of the Nautilus, and had found that the labial processes were inferior, and not interior, as stated by Prof. Van der Höven. He felt deeply indebted to the Professor for the kind manner in which he had brought forward the points in which he differed from himself.

Mr. H. E. STRICKLAND pointed out the various characters, external and internal, which prove the dodo to be an aberrant genus of the family Columbidae, and to have no connexion whatever with the vultures. His arguments were chiefly drawn from the form of the beak, the position of the nostrils, the form of the palatine bones, of the nasal fissures, and of the zygomatic bones, the muscular gizzard, the shape of the feet, the structure of the calcaneal processes, and of the posterior metatarsal,—all of which closely agree with the pigeons, and especially with the genus *Treron*.*

Dr. MELVILLE, who has lately made a minute examination of the head and foot of the dodo, drew attention to some additional characters, which confirmed Mr. Strickland's view of the affinities of that bird to the pigeons.—The PRINCE of CANINO stated that he was convinced that the dodo was neither a vulture nor an ostrich; but he must differ from his friend, Mr. Strickland, in placing it amongst the pigeons. He believed it was as much like the Gallinaceæ. The stones found in its gizzard did not prove it a pigeon. The sternum resembled more that of gallinaceous birds or even the struthious than that of the pigeons.—Dr. MELVILLE maintained that the sternum of the dodo more nearly resembled those of the pigeons than of any other family. The skin of the dodo proved that it was a pigeon.—Mr. PHILIP DUNCAN stated that the notices of the habits of the dodo were quite opposed to the notion that it was a pigeon. It was evidently not a frugivorous bird, as when first taken its flesh was so distasteful and smelt so badly that no one would attempt to eat it. He believed it a bird *sui generis*.

Prof. M. EDWARDS read an elaborate and learned paper 'On the Circulation of the Blood in the Crustacea,' in which he entered into an historical criticism on this subject; and stated the conclusions at which he had himself arrived. He also exhibited some specimens of beautifully dissected insects prepared by M. Blanchard, in which the existence of an exterior peritoneal tunic was found to exist around the central vessel of the circulatory system of insects.

Dr. MELVILLE inquired if all the blood in Crustacea passed through the branchial cavities?—Prof. M. EDWARDS replied in the affirmative.—Mr. G. NEWPORT expressed his pleasure at seeing the preparations of M. Blanchard; and believed that they explained some of the difficulties which he had formerly pointed out in the

* This is a very old hypothesis, first started by Reinhardt, if I recollect right.—*Ed.*

anatomy of insects. He had regarded the external tunic of the dorsal vessel of insects as auricular.

'On the Families of British Lamellibranchiate Mollusca,' by Prof. E. FORBES.—The object of this communication is to explain a classification of the Lamellibranchiate Conchifera, intended to be adopted by the author and Mr. Hanley in their forthcoming work on the British Mollusca. It is an attempt to group our native species in natural families, founded upon the more important and, at the same time, conspicuous features in the organization of the animals. The characters of the mantle, the siphons, and the foot, are taken as a basis, though recognized as of variable importance in the different tribes. The general habit, and often the sculpture, of the shell is usually in striking accordance with the most essential features of the animal. Characters derived from the hinge and from the position of the ligament, hitherto mainly depended upon by conchologists, prove to be in the majority of instances bad guides for determining the natural affinities of the mollusk, and seldom of more than generic value.

The following are the separate families adopted by the authors :—

SECTION A.—DYMIARIA.

1. PHOLADIDÆ—including *Teredo*, *Pholas*, and *Gastrochena*, as types of tribes ; the last associated with *Saxicava* and *Venerupis*, and probably *Neæra*, *Poromya*, and *Sphenia*. Animal with a mantle closed in front, leaving a small anteaal aperture for the passage of the truncate or digitiform foot. Siphons united nearly to their extremities, their apertures cirrhatated.

2. MYADÆ—including *Mya*, *Panopæa*, *Lutraria*, and perhaps *Corbula*. Mantle closed, except anteally, where it is open for the passage of a thick and digitiform, but not large foot. Siphons long, united to their extremities (which are slightly fimbriated), enclosed in an epidermic sheath.

3. SOLENIDÆ—of which *Solen* is the only British genus. Mantle closed, except anteally, where it is open for the passage of a very large, thick, obliquely truncate foot. Margins of mantle, where free, partly fimbriated. Siphons short, united, unequal, with cirrhatated margins.

4. SOLECURTIDÆ—*Solecurtus*. Mantle open anteriorly, for the large, thick, apiculated foot. Siphons with an enlarged united base, divided at their extremities, and having fimbriated apertures.

5. PANDORIDÆ. Mantle open for a falcate foot. Siphons unequal, partly united and divergent, with fimbriated apertures. *Pandora*, *Lyonsia*.

6. TELLINIDÆ. Mantle open and fimbriated at the margin. Foot digitiform or triangular. Siphons long, separated, often nearly equal, and having plain apertures. *Thracia* (?), *Scrobicularia*, *Abra*, and *Montacuta* (?), form one section of this group ; *Tellina* and *Psammobia* a second and more typical division.

7. DONACIDÆ. Mantle open, fimbriated at the margin. Foot broadly triangular. Siphons unequal, separate, and fimbriated at the edge. *Donax* and *Mesodesma*, and probably also *Diodonta*.

8. VENERIDÆ. Mantle open, fimbriated at the margin. Siphons united nearly to their strongly fimbriated extremities. Foot triangular. *Mactra* links this group with the last. *Venus* and its sub-genera are typical.

9. CYPRINADÆ. Mantle open, fimbriated. Siphons very short, united or nearly so ; one with aperture fimbriated, the other plain. *Cyprina*, *Astarte*, *Circe*.

10. *CARDIADÆ*. Mantle open, fimbriated. Foot hamate and digitiform. Siphons very short, united nearly to their ends. Apertures, one plain and one fimbriated. *Cardium*.

11. *CHAMADÆ*. Mantle closed, except a small aperture for the foot, and two fimbriated siphonal openings. Foot hamate. *Isocardia*.

12. *LUCINADÆ*. Mantle united in great part, leaving an opening anteaally for the foot, which is slender and digitiform. Siphons very unequal, one being often nearly obsolete; both apertures plain. *Lucina*, *Cyclas* (?)

13. *KELLIADÆ*. Mantle closed, except a small aperture for the foot, and two nearly sessile plain siphonal openings. *Kellia*, *Galeomma*, *Lepton* (?)

14. *UNIONIDÆ*. Mantle open. Siphons very short, fimbriated; sometimes one obsolete. Foot very large. *Unio*, *Anodon*.

15. *DREISSENADÆ*. Mantle in great part closed. Siphons very short, fimbriated, and foot digitiform. *Dreissena*.

16. *MYTILIDÆ*. Mantle open, and not closed, or only partly closed to form siphons. Foot very small, *Mytilus*; and in an allied group, *Pinna* and *Avicula*.

17. *ARCADÆ*. Mantle open. Siphons very short, or considerably developed and then united. Foot disciform. *Arca*, *Pectunculus*, *Leda*, *Nucula*.

SECTION B.—MONOMYARIA.

18. *PECTENIDÆ*. Mantle completely open, fimbriated and eyed. Foot well developed. *Pecten*, *Lima*.

19. *OSTREADÆ*. Mantle freely open. Foot obsolete. *Ostrea*, *Anomia*.

A discussion followed the reading of this paper, in which the PRINCE of CANINO, Mr. LOVELL REEVE, Dr. CARPENTER, and Prof. MILNE-EDWARDS, took part. The principal points alluded to by the speakers were the position of particular genera of shells in the arrangement of Prof. Forbes.

‘On the Anatomy of Scyllæa,’ by A. HANCOCK and D. EMBLETON, M.D.—The internal structure of this animal was found pretty accurately to agree with the details given by Cuvier, though some important matters relative to the digestive apparatus seem to have been overlooked. The presence of a gland at the commencement of the œsophagus, its small stomach receiving large ducts from the biliary masses, its large and long intestine, approximate it to the Dorididæ; but the stomach with an internal dental apparatus would appear to be peculiar. Its branched system of tubes in the skin and branchial tufts show its relation to the Eolididæ, but the re-division of some of these tubes in the periphery of the globular biliary organs, with the convolutions of which they communicate on the one hand, and the passage of others on the other hand into the intestinal canal, are peculiarities of structure not found in either of the families mentioned.

‘Notes on British Mollusca, with Descriptions of New Species,’ by J. ALDER and A. HANCOCK.—The species described have been discovered since the last meeting. They are *Proctonotus* (?) *splendidus*, remarkable for bearing a crest between the dorsal tentacles by which they are united together at the base. It is from Torbay and Fowey. 2. *Scyllæa pelagica*, taken at Falmouth by Mr. Cocks. 3. *Tritonia lineata*, from Scarborough. 4. *Eolis Peachii*, dredged by Mr. Peach in Fowey Harbour. 5. *Eolis exigua*, or *Laminaria*, at Fowey and Falmouth, possibly the *Tergipes lacinulatus* of Löven. 6. *Chalidis nigricans*, at Falmouth; with 7. *Acteonia corrugata*, and 8. the

type of a new genus, *Ictis*, allied to *Acteonia*, but differing in having dorsal tentacles and in the absence of the groove and angles at the sides of the head. The animal is limaciform. The head is scarcely angulated, and bears two linear tentacles on its dorsal aspect, behind and a little anterior to which are the eyes; frons a little behind the centre of the back. A single species, *Ictis Cocksii*, from Falmouth. The authors propose to unite the genera, *Elysia*, *Placobranchus*, *Acteonia*, *Chalidis*, *Limapontia*, and *Ictis* in a new order, characterized by the absence of specialized breathing organs or other dorsal appendages, and for which they propose the name of *Pellibranchiata*.

'Notice of Dredging Researches in Progress,' by Prof. E. FORBES.—A number of specimens of remarkable British animals were laid on the table, preserved in a very perfect condition by Mr. Goadby, who is at present accompanying Mr. M'Andrew on a dredging voyage in the seas of the Zetlands and Hebrides. Mr. M'Andrew has forwarded to the Meeting specimens of a living *Terebratula*, dredged off Skye; identical with the crag fossil, *T. cistellula*, of Mr. Searles Wood. A new *Holothuria*, discovered by Mr. Gwynn Jeffreys, was also laid on the table.

'On the Animal of *Lepton squamosum*,' by J. ALDER.—The mantle of this hitherto undescribed mollusk is very large, extending much beyond the shell, and is fringed with filaments; one of which is much longer than the rest. The mantle is open, except before and behind; where it forms a short siphon, with a single aperture. The foot is very large, thick and tapering; and has a disk like the foot of *Nucula*. It forms a fine byssus. The branchial leaflets are two on each side.

Mr. WATERHOUSE read a paper 'On the Geographical Distribution of the Rodentia.'

Mr. WESTWOOD read a paper 'On the Habits of some Blind Insects.'

The PRINCE of CANINO read a paper 'On the Classification of the Testudinata.'—The three principal groups into which he divided the whole of the species were,—1. *Testudinidæ*; 2. *Trionycidæ*; 3. *Chelonidæ*.

Prof. NILLSON read a paper 'On the Disappearance of certain Mammalia from particular districts of the continent of Europe.'

Mr. PEACH announced some additions to the Cornish Fauna. The whole of the species of *Zoophytes* found in the British islands are 224, of which 150 have been found in Cornwall. He now added *Corymorhynchus nutans*. In shells he had found *Lepton squamosum*, *Pleurotoma teres*—in other departments, *Planaria vittata*, *Oniscus ceruleatus*. He also exhibited specimens of *Botrylli*, preserved in Canada balsam, with all the colours perfect; also the nidus of the *Gurmellus*, attached to the under-side of stones found in Fowey Harbour.

Mr. WESTWOOD stated that *Oniscus ceruleatus* was an interesting discovery, and described its structure, and drew particular attention to the enormous development of the thoracic segments.—Mr. CHARLESWORTH inquired the particulars of the finding *Lepton squamosum*, as this had been hitherto regarded as an extinct species, belonging to the older Tertiaries.—Prof. E. FORBES drew attention to the *Pleurotoma teres*. He had first dredged it in the *Ægean*; it had since been found in Norway, by Prof. Löven, and now in Cornwall. He believed it was always found in what he called the glacial outliers of modern seas—those places he had recommended for cod-fishing.

Mr. W. THOMPSON announced the discovery of species of *Teredo*, *Limnoria*, *Xylophaga* and *Chelura*, in Ireland, all of which were found contributing to the destruction of a pier.

A discussion followed the reading of this paper, on the mode in which the Mol-

lusca bore into wood and other materials. — Prof. E. FORBES' stated that some of the Gasteropoda had tongues covered with silica to enable them to bore, and it was probably by some process of this kind that all the Mollusca bored. — Mr. PEACH had never observed the species of *Pholas* to turn round in their holes, as had been stated by some observers, although he had watched them with great attention. — Mr. CHARLESWORTH referred to the fact that, in one species of shell, not only did the hole in the rock which the animal occupied increase in size, but also the hole through which it projected its siphons.

'On the genera *Nebalia* (*Leach*), and *Chirocephalus* (*Prevost*); *Brachipus* (*Schæffer*),' by Dr. BAIRD. — Upon an attentive examination of the species of the genus *Nebalia*, described by different authors, the writer is induced to reduce them to two: — 1st. *Nebalia bipes*, *Cancer bipes* (*Fabricius* and *Herbst.*), *Monoculus rostratus* (*Montagu*); *Nebalia Herbstii* (*Leach*). 2nd. *Nebalia Geoffroyi* (*Milne-Edwards*), *Nebalia Straussi* (*Risso*). With regard to the *Chirocephalus* of *Prevost*, it appears evident that the genus *Branchipus*, as originally described by *Schæffer*, and minutely figured by him in all its details, is quite distinct from the species found in England, and described by authors under that name. The differences are so great and well marked, that it is necessary to refer them to the genus *Chirocephalus* of *Prevost*, so beautifully figured at the end of *Jurine's* work on the *Monoculi* of Geneva.

A Plea for the North-Atlantic Sea-Serpent. By CHARLES COGSWELL, M.D.

"EVERY generation of man is born to stare at something, which so long as it eludes their understanding, is a very African *fetishe* to the many, and a Gordian knot to the few." — *Hawkins's Memoirs of Ichthyosauri and Plesiosauri*.

Of the numerous contributions supplied through the press to support the cause of the subject of this article, one of the most recent has arrested my attention, because of the particulars having been long since familiar to me by oral communication from the writer in person. I allude to the interesting narrative contained in the 'Zoologist' for May last, describing a meeting with such an animal off the coast of one of the British provinces, stretching out into the Atlantic to the north-east of New England. It is worthy of notice that several animals of the Cetaceous kind (sometimes conjectured to have been a source of deception) were seen and scanned *in limine*, and an opportunity was thus afforded for immediate discrimination. Immediately subjoined is another statement, copied from a foreign newspaper, being the tribute of a French sea-captain to the same object, but qualified with so much of the characteristic national precision in the detail of certain forms and measurements, as rather to display an elaborate view of disjointed parts, than represent them all in harmony together as belonging to one individual. It betrays the caution of a witness, who would fain keep an opening in reserve for escape from a precarious position. The former adventure took place in 1833, the latter in 1840, and now they are related almost simultaneously within the last few months.

Nor is this delay to be wondered at, when we consider how much the reverse of unbiassed is the tribunal of public opinion, before which they appear. It will hardly be denied that there is no debateable point in the modern records of observa-

tion more complacently devoted to ridicule by all but universal consent, than that of the existence of huge serpent-like animals in the North Atlantic Ocean. The very mention of the name of sea-serpent in the singular number with the definite article prefixed, suggests to most minds an idea of some anomalous monster, without parentage or congeners, feigned to haunt the recesses of the deep, and, like the ghost of vulgar superstition, manifesting itself now and again for the sole conceivable end of adorning some wonderful legend. This impression, favoured by the circumstance of no actual specimen having ever occurred to the observation of a naturalist, much less been obtained for deliberate examination, has caused the subject of our notice to rank with the mermaid, the unicorn, the griffin, and other prodigies of the olden faith. It does not fail to be objected that Norway, a locality most fruitful in accounts of the appearances in question, has been immemorially distinguished for a vivid perception of the marvellous. Nor, after hearing the other side of the Atlantic, are we much better able to divest our minds of suspicion with regard to the trustworthy character of the witnesses; our relative in the west having acquired nearly as much celebrity for the endowment of a grand inventive genius as his Scandinavian ally in the cause of sea-serpents. They differ indeed, in so far as the latter believes and venerates his own creations, while the American indulges his fancy for the purely benevolent purpose of what is called "hoaxing" the unwary public. Not many years since, it may be recollected, one of these pleasant philosophers enlightened his fellow-mortals with a "true and particular" description of certain winged inhabitants assumed to have been discovered in the moon by an eminent living astronomer, giving the details with so much simplicity and affected candour with regard to some particulars, in the manner of 'Gulliver's Travels,' that many readers were not aware of its being a fabrication. Such proofs of a disposition to practise on the public credulity, too often repeated, necessarily communicate a colouring of insincerity to all other reports of strange events emanating from the same source, and certainly demand the exercise of an unusual amount of circumspection, though they do not justify scepticism, in the case now before us.

Making due allowance for these peculiarities in the testimony, we may, nevertheless, proceed in a spirit of induction to examine into the tendency of the collateral evidence. The question after all, when reduced to its simplest form, comes to be little more than one of geographical distribution. That is to say, that even if we choose to confine the animal to the true serpents, which has been the ordinary conception heretofore, there is no obvious impediment to oppose it, either on the score of want of analogy, or of structural incapacity. Amphibiousness, to commence with, in its popular acceptation, or the capability of spending a considerable time in the water, is one of the most familiar properties of serpents, as illustrated in the common snake (*Coluber natrix*) and the viper, the only two species, if we except the blind-worm, ascertained to be indigenous to these islands. "Snakes," observes Professor Bell ('History of British Reptiles') "are extremely fond of the water, taking to it readily, and swimming with great elegance and ease, holding the head and neck above the surface. It is extremely probable that they resort to the water in search of frogs." In the learned system of Schlegel, translated by Professor Traill—the 'Physiognomy of Serpents'—members of various ophidian groups are characterised as living near and inhabiting lakes and rivers. Some belong to the genera *Tropidonotus* (which here includes the first named British species), and *Homalopsis*, comprised under the head of '*Fresh-water Serpents*.' Of the Boas, this author says, "several species frequent

fresh water, and there are some of them essentially aquatic," among them the *Boa murina*, the largest of known serpents, and his two species of *Acrochordus*.

Further, and what completely sets at rest the part of the case we are now considering, there are swarms of *marine* ophidians inhabiting the warm latitudes of the Pacific. These "appear to have been partly known to the ancients. Cælian informs us that *Hydræ* with flat tails were found in the Indian Seas, and that they also existed in the marshes. He also tells us that these reptiles had very sharp teeth, and appeared to be venomous. According to Ctesias, the serpents of the river Argada, in the province of Sittacene, remain concealed at the bottom of the water during the day, and by night they attack persons who go to bathe or wash linen." (Griffith in Cuvier). Schlegel has no less than seven species collected under the generic name of *Hydrophis*, constituting his family of *sea-snakes*; they are especially fitted for aquatic life, having the nostrils directed vertically and furnished with valves, and the tail flattened like an oar; they reside in the sea exclusively, never going on land, and are supposed to prey on fishes. Their limits belong to the intertropical regions of the Indian Seas, or of the great Pacific Ocean.

The existence of *bonâ fide* sea-serpents being therefore a matter of notoriety, (and preserved specimens are to be seen at any time on the shelves of the British Museum), we have but to address ourselves to the subordinate inquiry, whether there be sufficient reason for assigning to any of the family a habitat in the North Atlantic Ocean. And here it is necessary to put away all that idea of deviation from the common order of nature, which would connect the evidence heretofore given with some isolated excrescence, so to speak, of the animal kingdom. The great size attributed to them has, doubtless, served very materially to produce an unfavorable impression. Schlegel limits the extreme length of the greatest known serpent to twenty-five feet, although such naturalists as Cuvier and Milne-Edwards, allow an extension of thirty or forty feet to some of the Boas. These estimates do not fall so far short of those contended for in the present instance as to form an insuperable ground of objection. Many witnesses, whose character and station in life command respect, whatever judgment may be formed of their powers of correct observation, profess to be fully persuaded that they have seen immense creatures, resembling serpents, in the vicinity of the European or the American shores. The several depositions from Norway that appeared in the 'Zoologist' for February last, comprise the testimony not only of fishermen, drawing their subsistence from the sea, and familiar with the more prevalent forms of its inhabitants, but of a class commonly presumed to be well educated, as merchants, clergymen, and a surgeon. Their observations indeed vary on the subject of length (varying between forty and one hundred feet), and likewise on some of the details of outline, so that they may either relate to different specimens, or to deceptive phenomena producing dissimilar impressions, whichever alternative the critic may be inclined to prefer. The first notice, transmitted by an English gentleman, holding a responsible appointment under the Crown in one of our transatlantic dependencies, is calculated to supply any deficiency on the part of the new hemisphere, so far as a faithful representation of what was submitted to the eye alone may remain a desideratum. But for the resolution manifested in this periodical, to allow the question a fair hearing on its sterling merits, there can be little doubt that this testimony would not have been forthcoming; like, in all probability, more of the same ingenuous stamp, which the unwillingness of the principals to oppose the current of public opinion, directly

proportioned to the value of the character they run the risk of compromising for no obvious use, induces them to withhold.

But it may be asked, how is it possible to explain the circumstance of these *monstra natantia* being encountered no farther South than about the sixtieth or fifty-fifth parallel on the European boundary, while in the American waters their domain approaches so much nearer the Equator, as Nova Scotia (or New Scotland) and New England? By a curious and happy coincidence, of like significance to many that are constantly springing up to confirm the results of independent research, such for instance as the print of the piscivorous gavials in a prior leaf of the "stone book" to the mammalivorous crocodiles; it happens that precisely a line swerving from Norway in a southerly direction to Massachusetts, is the boundary likewise of other marine animals of corresponding types. Among the divisions of the North Atlantic, recently marked out by Professor Edward Forbes, as determined by the presence of similar forms of animal life, occurs what is called the "Arctic and Boreal" province, which "sweeps across the northernmost part of the North Atlantic from Europe, extending down the coast of North America as far as Massachusetts, but nothing like so far on the European side as the American." (Lecture at the Royal Institution, May 14th, 1847).

Thus copiously backed by the most affirmative evidence, both positive and circumstantial, all contributing to establish his lawful claim to entity, the "great unknown" of the North Atlantic has still to overcome the strong feeling of discredit so widely associated with his past history, before he can hope to be understood as seriously claiming to be a subject of the animal kingdom. If men of the highest name in science condescend to notice him at all, it is most probably with a smile at the expense of what they consider a crude invention, to which no importance should be attached. But authority, however exalted, has no patent of final adjudication in cases where its means of information are confessedly imperfect, as compared with those enjoyed by the supporters of a disputed position. The learned world was centuries in believing the story of Herodotus about little birds resorting to feed on insects within the "stretched jaws" of the crocodile. Bruce all but ruined his credit for a time by relating that he had seen the Abyssinians eat the raw flesh cut from one of the haunches of a living cow; and there are some who, with no more reason, pretend to doubt the good faith of a contemporary traveller, who declares that he once made a brief excursion on the back of an alligator. The conflicts of discovery and opinion, engross indeed no small share of the history of human knowledge. There are cases, no doubt, in which both the senses and the judgment of incompetent persons are liable to be imposed upon by irrelevant facts created or qualified for the occasion. But here there is no hypothesis concerned requiring nature to be tortured into its service; physiology can have no latent objections, ready to start up unawares and make a mockery of belief, because some of the serpent kind are indubitably organized for an aquatic medium; the laws of geographical distribution, deduced irrespectively, yield their consent; and the integrity of not a few of the narrators is unimpeachable. Are we justified in rejecting the text because the interpretation may not harmonize with our views; in imputing wilful dishonesty to those who merely describe to the best of their ability what their eyes have disclosed to them? We do not despise the mermaid, the triton, and syren, as altogether imaginary, but endeavour to reconcile at least their physical attributes with those of the the seal or oriental dugong. The unicorn is

supposed to have its original in the narwhal; and the griffin is recognised as a well-known friend in an antiquated garb, being no other than the tapir, somewhat disfigured by travellers, and further indebted to the artist for a pair of wings and an architectural style of tail. Even the ghost-seer is seldom suspected of intentional fraud, however justly we may believe him to be the dupe of an imagination acted on by some positive phenomenon. The collateral truths which testify on the affirmative side have been dwelt upon to some extent, and shall again be adverted to presently. On the other hand, surely there must be something peculiar in the economy of a vast air-breathing race, frequenting well-known tracts, and yet never visible but by the merest accident; nor is it any sufficient answer to refer to the construction of the breathing apparatus, distinctive of the marine ophidians, enabling them to live long under water, and respire air with an almost imperceptible exposure above the surface, because the like provision does not prevent the Pacific denizens from being abundantly subject to observation. The want of conformity in some of the reported particulars of form and dimensions is of insignificant moment, and may easily be converted into a proof of innocence of design. Above all, the objections, be it understood, are not *of the kind* which the public at large appear to imagine them. There is nothing ridiculous or abnormal in the idea of a sea-serpent. So far from this, the philosopher should rather be required to give a reason why at least the warmer situations of the Atlantic are unprovided with occupants corresponding to those which dwell in the opposite region of the globe.

If the diversity of detail be accounted too serious an objection to be so lightly dismissed, is there no other organization within our cognizance which more satisfactorily embodies the several conditions rather loosely intimated than prescribed throughout the problem? The portraits given in authors of the restored Plesiosaurus, albeit conceived to represent beings that "filled up the measure of their years long before Eden was planted, and the dominion of man made of the red earth, acknowledged" (Hawkins), offer several particulars answering to those ascribed in most of the notices on record to the so-named sea-serpent, — the long, over-arched neck, the huge trunk, the protracted tail, and sometimes (see the deposition of Archdeacon Deinboll, 'Zool.' 1606) an appearance of fins or paddles. This coincidence is the more remarkable, because no one can suppose it to have been preconceived. Hence the ingenious suggestion of the Editor of the 'Zoologist,' that the animals may belong to one of the Enaliosaurian types, seems to supply the only deficient link in the chain of demonstration, before we arrive at the final proof, a spectacle open to all observers. The neck of the Plesiosaurus (presuming this to be the genus indicated) "is composed of upwards of thirty bones, a number far exceeding that of the cervical vertebræ in any other known animal. This reptile combines in its structure the head of a lizard, with teeth like those of a crocodile, a neck *resembling the body of a serpent*, a trunk and tail of the proportions of those of a quadruped, with paddles like those of turtles," (Mantell's 'Wonders of Geology'). If this seemingly whimsical coaptation of incongruous members, which the dictum of science has consigned to the doom of pre-Adamite extinction, can be suspected without unpardonable heresy to be yet among the living,* what is more allowable than to surmise that persons even of cultivated in-

* To show the difficulty of fixing a date for the existence of wild animals, historians announced the destruction of the wolf in this island ages before the good work was

tellect, but quite unconscious that such things had ever existed, may have all honestly striven, more or less, to mould their visual perception into accordance with the familiar notion suggested by its general outline; and thus have given rise to the confusion objected to in their reports. Be this as it may, the discovery by Mr. Darwin of *marine* saurians, though but three or four feet long, about some of the South Sea islands, contradicts any assumption that animals approaching to it in character are no longer extant. To account upon this supposition likewise for the hide-and-seek sort of life which those in question seem to lead, it may be observed that "the breathing-holes of the Plesiosaurus differ from those of all other existing reptiles, and resemble those of whales." They are placed "near the highest part of the head, where they would enable the animal most readily to breathe without exposing anything more than the apertures themselves above the water, corresponding admirably with the marine habits of the animal as indicated by the structure of its extremities," (Ansted's 'Ancient World,' 1847).

Without committing myself to anything more than a belief that the subject is one fairly entitled to be considered an open question — open to the unrestrained testimony of future casual observers, equally with the criticism of the scientific — I feel assured that I cannot better express the opinion which every candid peruser of what has been stated must be prepared to arrive at, than by using the words of a naturalist who has given his attention to these remarks. "The argument appears to me perfectly satisfactory in favour of at least a suspension of judgment on the subject. The question is whether the evidence is such as would induce any man to believe, whose mind was prepossessed with no notions at all respecting it. Should we credit the testimony, if the animal to which it relates were claimed to be a mere variety? I think we should."

CHARLES COGSWELL.

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accomplished, and the stag was said by Buffon to have disappeared south of the border prior to 1760, although still to be met with in Somerset and Devon. The same hurry to exterminate has elicited rebuke with regard to the beaver in France, the ibex in the Pyrenees, the elk, bison, &c. in their respective localities. There is a current tradition among the North-American Indians of a gigantic wild beast destructive to their forefathers, which answers from their description to the Megatherium; this creature's bones are found in company with those of the horse; the latter, although long refused to the New World, is strongly suspected to be of native origin, independently of its introduction by Europeans since the period of Columbus.

See the volume on 'Horses,' with the appended memorandum by Col. Hamilton Smith, forming part of the 'Naturalist's Library.'

Pike.—"It is frequently said that putting pike into a lake would destroy the trout-fishing; but I have invariably found that in all the lakes of a considerable size, where the pike were plenty, the trout have improved very much in size and quality, and not diminished in numbers to any great extent."—*Wild Sports of the Highlands*.

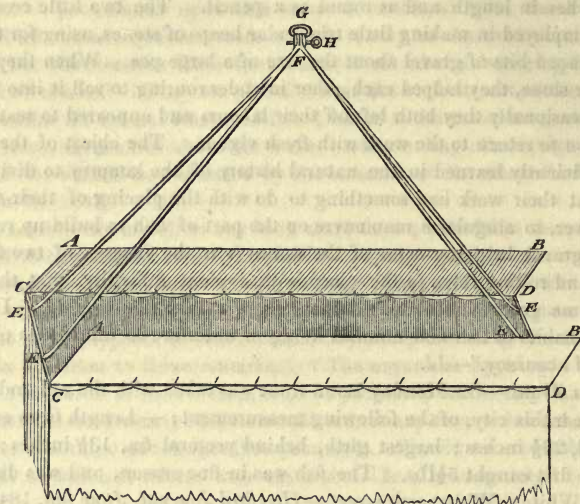
Lamprey.—"One summer day I was amused by watching the singular proceedings of two lampreys in a small ditch of clear running water near my house. They were about six inches in length and as round as a pencil. The two little creatures were most busily employed in making little triangular heaps of stones, using for the purpose irregularly shaped bits of gravel about the size of a large pea. When they wished to move a larger stone, they helped each other in endeavouring to roll it into the desired situation: occasionally they both left off their labours and appeared to rest for a short time, and then to return to the work with fresh vigour. The object of their building I am not sufficiently learned in the natural history of the lamprey to divine; but I conclude that their work had something to do with the placing of their spawn. It seems, however, so singular a manœuvre on the part of fish to build up regular little pyramids of gravel, bringing some of the stones from the distance of two feet against the current and rolling them to the place with evident difficulty, that the lampreys must have some good reason which induces them to take this trouble. It is a great pity that the habits of fish and animals living in water are so difficult to observe with any degree of accuracy."—*Id.*

Enormous Trout.—On Monday last a trout was taken with the rod and line in the river Wye, near this city, of the following measurement:—Length from end of snout to end of tail, $22\frac{1}{2}$ inches; largest girth, behind pectoral fin, $13\frac{1}{2}$ inches; male fish; weight when first caught $5\frac{1}{2}$ lbs. The fish was in fine season, and was displayed for sale at Mrs. White's, Widemarsh-street.—*Hereford Journal*, June 9th, 1847.

Description of Ball's Dredge.

THE 'Zoologist' presents but a scanty list of papers on Marine Zoology, but every year this branch of science assumes an increased importance, ever since the dredging researches of Professor Edward Forbes in the Ægean Sea were given to the world, and with respect to the Mollusca, their claim to the title of the "Medals of Creation," as given them by Bergman, is more firmly established, by enabling us better to understand the circumstances under which the stratified rocks have been originally deposited. And independently of this, no naturalist can read the interesting 'Lectures on Zoology' of Professor R. Jones, or the excellent little work entitled 'Introduction to Zoology for the use of Schools, part 1st. Invertebrate Animals,' by R. Paterson, Esq., without feeling anxious to form some practical acquaintance with the subjects of so much pleasant discourse. All fishermen are at first with difficulty induced to preserve the rejectamenta of their traps, lines, nets, and dredges. Littoral rambles on a productive coast are very instructive, but the dredge is the principal source of our knowledge of the marine Invertebrata; this implement, however, is only used where there are oyster banks: it is cumbrous in form, and expensive in its management, requiring a large boat, and a stout crew; however, Robert Ball, Esq., of Dublin, invented a dredge which is so light and portable, and withal so efficient, that

it has met with the universal approbation of all British naturalists, and I hope that the accompanying figure and description of this dredge may prove acceptable to the readers of the 'Zoologist,' and sufficiently explicit to enable any one to direct a country blacksmith in its construction. In the practical use of the dredge, I have no experience, but hope, ere long, "to be afloat."



Ball's Dredge.

The figure represents the dredge mounted and prepared for action: the two scrapers ABCD and EFGH are each twenty inches in length, by two inches in breadth; parallel with their lower edges CD and GH, about fourteen holes, equidistant from each other, are pierced to receive the laces of the bag, and these two plates are joined at their lower extremities, by means of two cross bars CC' and DD', so as to form an angle of about 45° with the plane of this position; each cross bar is five inches in length, by three and a half eighths in diameter: the arms EF and E'F' are each sixteen inches in length, by three-eighths in diameter, and play upon the cross bars by means of double swivel joints, as seen at EE' and EE'. Their anterior extremities at F and F' are beaten flat, so as to meet closely and vertically, and are pierced for the reception of the bolt H, which, at the same time, passes through the extremities of what may perhaps be termed the bridle ring G, to which the rope is affixed. The head of the bolt H is pierced to receive the end of a little iron spike for the better working of the screw, and at any time, by drawing the said bolt H, and folding the arms inwards, the whole apparatus may be stowed away in a moderate sized carpet bag, for its weight will not exceed seven or eight pounds, and the cost of one made by Messrs. Sibbald and Sons, George-street, Edinburgh, is only seven shillings; the above description is taken from one of their manufacture, and it is the favourite size of such as they have made for Professor Edward Forbes and J. Goodsir. In no case should the bag ex-

ceed eighteen inches in depth ; one may be made of best twine, with meshes half an inch apart, and another of cheese-cloth or serge for fine work ; but perhaps I cannot do better than state the results of conversation I had on this subject with J. S. Bowerbank, Esq., of London, and Lieutenant Thomas, R.N., at a recent meeting of the Berwickshire Naturalists' Club.

The strength of the rope required for Ball's dredge must be regulated entirely by the depth at which it is employed, in all cases a 14lb. weight should be attached to the rope, six inches distant from the dredge. A raw hide, such as has been imported as a wrapper for bales of tobacco or tallow, and which may be purchased in London for eighteen pence, will make three bags of the most durable and efficient description, and they should have holes a quarter of an inch in diameter, cut with a punch or simply stabbed with a knife, to facilitate the discharge of the water, and to save the trouble of canting the bag after it is drawn up from the water, there should be a slit five inches in length cut in the bottom and laced with a thong. A man and a boy (or two men and a boy, I forget which) are able to manage the whole apparatus.

A boat's grapnel and a cabbage-net will form a useful implement in case of need.

Two or three moderate sized sieves are required for sifting mud and sand, the height of the sieves may be four or five inches, and the meshes of their copper or brass wire bottoms should be one-tenth of an inch apart ; by attaching three strings, which are held in the hand, the more valuable contents of the sieve are readily exposed by repeated dippings in the water.

Perhaps I may be allowed to suggest that the skin of a sheep, which may be purchased for fourteen pence or thereby, after the wool is shorn off, will form a pretty good substitute for a hide. In the Appendix to Messrs. Tulk and Hensley's 'Anatomical Manipulation,' there are some excellent notes on dredging by Professor Edward Forbes, which the Editor may transcribe, if he thinks proper.—*Archibald Hepburn ; Whittingham, June 14th, 1847.*

Notes on the Preparation of Specimens of Asterias and Crustacea.—To Mr. Bowerbank, I am indebted for these useful notes, which cannot be too widely known to naturalists, and it is on this account, that I trust, Mr. B. will pardon the liberty taken in giving them publicity.

Fasten two or three threads to the arms of *Asterias* and plunge them suddenly into boiling water. The magnificent *Asterias papposa*, which I have obtained over seven inches in diameter from our coast, should have a bath for four minutes. *Asterias glacialis*, the common species, for three minutes, and the little *Pinnotheras* or pea crabs found in *Modiola vulgaris* for two minutes ; they are then dried in a draft.

The larger Crustacea should be allowed to steep in fresh water till their flesh becomes putrid and fluid ; the specimen is then suspended or laid in different positions until the contents of its shell shall have run off, and after being dried in a draft, it is fit for the cabinet.—*Archibald Hepburn ; Whittingham, June 14th, 1847.*

The Poet Gray's copy of the Systema Naturæ.—Mason, in his 'Life of the poet Gray,' says in a note, page 321, vol. ii., "I have given in the beginning of this section, an account of the great pains which Mr. Gray bestowed on Natural History. I have since been favoured with a letter from a gentleman, well skilled in science, who, after carefully perusing his interleaved 'Systema Naturæ' of Linnæus, gives me the character of it. 'In the class of animals (the Mammalia) he has concentrated (if I may use the expression) what the old writers and the diffuse Buffon have said upon the subject; he has universally adapted the concise language of Linnæus, and has given it an elegance which the Swede had no idea of; but there is little of his own in this class, and it served him only as a common-place; but it is such a common-place that few men but Mr. Gray could form. In the birds and fishes he has most accurately described all that he had an opportunity of examining: but the volume of insects is the most perfect; on the English insects there is certainly nothing so perfect. In regard to the plants, there is little else than the English names and their native soils, extracted from the 'Species Plantarum' of Linnæus. I suppose no man was so complete a master of his system; he had selected the distinguishing marks of each animal, &c. with the greatest judgment, and what no man else probably could have done, he has made the German Latin of Linnæus purely classical.'"

[It would be highly creditable to the Ray Society to print a work of this kind: I am told it may be considered public property at least for such a purpose as publication: what a treat it would afford to the British naturalist: how infinitely preferable to some of the useless volumes this Society has issued.—*E. Newman*].

*Extracts from Jenyns' Observations on Natural History.**

[The obvious similarity of Mr. Jenyns' work to White's 'Selborne' has led many reviewers to laud it somewhat too highly: in accuracy and originality it is very inferior to its prototype: it is Natural History attenuated, spun out, made into a book: still it has pleasant and useful passages: here they are.—*Edward Newman*].

Lying down of Cattle, &c.—"The most common occurrences, and such as are brought under our eyes every day, sometimes escape the notice of inobservant persons. A farmer, who had lived all his life among stock, was not aware, till I drew his attention to the fact, that horses and oxen rise from the ground differently. There is a slight difference in their mode of lying down, the horse not generally remaining so long upon his knees as the ox, before bringing the rest of his frame to the ground. But in getting up, the horse invariably rises first upon his fore-legs, before rising upon his hind. The ox, on the contrary, rises first upon the hind, and often remains upon his knees some few seconds until his hind legs are straightened. These differences probably prevail throughout the two Cuvierian groups of Pachydermata and Ruminantia, to which the horse and ox respectively belong. The elephant and rhinoceros both rise first upon their fore-legs, like the horse; so does the pig: the sheep, goat, and deer, in this respect, are like the ox."—p. 49.

Action of Quadrupeds in walking, &c.—"The horse, in trotting or walking, lifts his feet off the ground in a certain order: first he raises the off fore, then the near hind, then the near fore, and lastly the off hind. The appearance, as is well known, is that of the two legs which are diagonally opposite being raised nearly simultaneously; but the two on the same side following one another at a moderate interval, the hind one advancing first. The elephant, as many observers have noticed, appears, in walking, to move the two legs on the same side at the same time; and it has occasionally been thought that the order in which the legs are raised from the ground is different from that in the horse. But, upon close watching, it will be seen that this order is in all cases the same; the only difference consisting in the length of the intervals between taking the feet successively up. In the elephant, the interval between raising each hind-foot and the fore immediately in advance of it is very short, and it becomes relatively shorter as the pace increases. When the animal walks very slowly, the legs appear to move just as in the horse; the interval in the two cases being the same. The same may be observed in the rhinoceros, though I have had no opportunity of noticing this animal moving fast, so as to say whether it then resembles the elephant in the appearance of the legs or not. The giraffe, whether it walks fast or leisurely, appears to move the two legs on the same side together, as in the elephant. It is observable, that both the giraffe and the elephant have short bodies (the former especially) in respect of their height and length of leg. Whether this has anything to do in lessening the interval above spoken of, I am not prepared to say; but I thought I observed, when the rhinoceros was walking slowly, in which animal the body is rather long in comparison of the legs, that this interval was also *longer* than in the horse, as it is *shorter* in the two animals just mentioned."—p. 49.

Different Taste for Food in Cats.—"Happening, on one occasion, to throw a dead long-eared bat to a cat, the latter was observed to seize it with the greatest avidity, at the same time uttering a kind of savage growl (as cats often do when they capture a favourite prey); and presently retiring with it to a corner, soon devoured it entire, not rejecting even the flying membranes. This was a well-fed, parlour cat, and apparently not suffering particularly from hunger. On repeating the experiment with another cat, this last took not the least notice of the bat whatever, though repeatedly placed in its way. This shows how different individuals of the same species will occasionally differ in respect of food; and how little importance is to be attached to the fact of any particular food being selected by an animal in a single instance. Thus I have seen, in some botanical books, mention made, in the case of certain plants, that "a horse ate it," or "a cow refused it"; when perhaps, on a second trial, another horse would have refused it, and another cow have eaten it."—p. 54.

*Habits of the Hedge-hog.**—"Oct. 28th, 1828.—Hedge-hogs are still about, and on the alert for food. I fell in with one to-day in my walks, in a sheltered part of the garden, which I was enabled to watch unobserved, and which afforded me an opportunity of seeing a little into their habits and mode of feeding. It was creeping up and down a grass walk, apparently in busy search for worms. It carried its snout very low, insinuating it among the roots of the herbage, and snuffing about under the dead leaves which lay about. After a time, it commenced scratching at a particular

* *Erinaceus europæus*, Linn.

spot, to which it seemed directed by the scent, and drew out a very large worm from just beneath the surface of the ground. This it immediately began to devour, taking it into the mouth by one extremity, and gradually eating its way to the other; an operation which lasted some time, and was attended by an incessant action of the teeth, which grated upon one another with a peculiar noise. After the worm was all gone, as I thought, I was surprised to see the whole put out of the mouth again; and, from the appearance of the cast, I was led to believe that it had been only subjected to the action of the teeth, for the purpose of being bruised, and squeezing out the soft internal parts of the body, which alone were eaten in the first instance: the skin itself, however, was shortly retaken into the mouth, and the whole clean devoured.

"From the above observation, it is probable that worms form no inconsiderable part of the food of the hedge-hog, and that they are enabled to detect them by the smell, and to extract them from the ground with their snout, after the same manner that the hog uses his in searching for buried food. In the above instance no attempt was made to kill the worm before eating it; but that part of the poor creature which was still out of the mouth of the hedge-hog kept up a perpetual writhing as the nibbling of its other extremity proceeded."—p. 61.

*Voracity of the Common Shrew.**—"The extreme voracity of the mole is well known.† The shrew, which belongs to the same natural group as the mole (the insectivorous Carnivora), would seem to resemble it in this peculiarity, according to a statement furnished to me by my esteemed friend Mr. Selby, of Twizell. He observes in a letter received February, 1843: 'What greedy gluttonous animals the shrews appear to be! One was caught alive upon the snow here the other day, and brought into the house, and placed in a glass box: a piece of raw mutton was given to it, which it attacked with the greatest voracity the moment it smelt it; and it continued eating almost without intermission till it had devoured the whole of it. The piece, I should think, could not have weighed less than half or three quarters of an ounce. When the shrew first seized it, it shook it as a dog does a rat, and then began to gnaw it with its sharp-pointed grinders on one side of the mouth. It lived for a couple of days, almost continually eating; and previous to its death, which was very sudden, seemed in perfect health.'"—p. 62.

Habits of the Stoat.—"The circumstance of the founmart's occasionally preying upon eels is well known to the readers of Bewick's 'Quadrupeds,' where there is an instance given of this fact.‡ Mr. Selby has observed the same predilection for this kind of food in the case of its congener the stoat. The particulars which he has sent me, connected with this discovery, are as follows. During the course of a walk, in com-

* *Sorex tetragonurus*, Herm.

† Mr. Bell, in his 'British Quadrupeds,' quoting from Geoffroy St. Hilaire, says, "The mole does not exhibit the appetite of hunger as we find it in other animals; it amounts in it to a degree of frenzy. The animal, when under its influence, is violently agitated; it throws itself on its prey as if maddened with rage; its gluttony disorders all its faculties, and nothing seems to stand in the way of its intense voracity."

Mr. Jesse also observes, that, "as soon as the mole is caught and placed in a box, it will begin to feed with the utmost unconcern." 'Gleanings in Natural History,' (3rd Ser.) p. 167.

‡ Eighth edition, page 253.

pany with his brother-in-law, Captain Mitford, R.N., by the margin of a rivulet in time of severe frost, and when the ground was covered with snow, their attention was drawn to the trace of an animal, close to the margin of the ice, where an open current still remained unfrozen from the swiftness of the stream. At this spot the footmarks were very numerous, and the animal appeared to have been frequently moving to and fro within a circuit of a few yards. The trace, which was supposed to be that of a stoat, was followed to a burrow about a quarter of a mile lower down the bank of the rivulet, the footsteps being accompanied by further marks upon the snow, which were attributed to the prey it had secured, whatever that might be. The entrance to the burrow was a little larger than that of a mole-hole. Spades were immediately procured, with a view of digging the animal out, if possible, and ascertaining what the prey was by which the above marks were made. In following the hole, care was taken to keep a stick constantly in advance to mark the direction of the burrow, the earth being soft and rather sandy. It was found to penetrate much further and deeper than was expected; and it was necessary to dig several yards before any approach could be made to the animal's retreat. At length some remains were met with, which appeared to be a mass of fatty decomposing animal matter; but which, upon closer examination, proved to be the skin of an eel turned inside out. A little further on, more of the same substance was observed, as well as the remains of a water-rat, and the feathers and bones of what seemed to have been a moor-hen.* After a few more spadefulls had been thrown out, they came close upon the animal, which then bolted, but was almost instantly seized and killed by a terrier in attendance. It proved to be a male stoat of the largest size, nearly clothed in its winter or ermine garb; the cheeks, shoulders, and ridge of the back alone being interspersed with a few reddish brown hairs. At the end of the retreat, where the hole was enlarged, the remains of other eels were found, and among them one quite fresh; which, judging from the marks observed upon the snow, as above alluded to, was supposed to have been caught the preceding night. This it had begun to devour, commencing with the head, and proceeding to eat downwards, at the same time turning back the skin, probably by the aid of its fore feet; and this accounts for what had been observed in respect of the other skins, which were all, as already stated, turned inside out. How the stoat succeeds in catching its slippery prey at this inclement season, when the eel, as has been generally supposed, is inactive, or nearly dormant, is a problem which remains to be solved."

—p. 64.

Stoat caught by a Cat.—"In one instance a cat seized a more unusual prey. As we were strolling near the house, we heard the cry of some animal in distress, and, on going to the spot whence it proceeded, observed a cat crouched in the long grass of a meadow with some animal in its claws that was struggling for liberty. As we approached nearer, the cat scampered off, leaving its booty behind, which to our surprise turned out to be a large stoat, that likewise took to its legs as soon as it was released, not apparently injured. This was to me quite a new fact, that any cat, at least of the domestic kind, would attack so powerful and fierce an animal as the stoat. Had it been undisturbed, would it have devoured its prey; or was the latter merely seized from that innate propensity to rapine and violence which characterizes the feline race? That the stoat was conscious of being in stronger hands would appear

* *Gallinula chloropus*, Lath.

from the cries which it uttered, and from its making no attempt to attack the cat, evidently under the influence of great alarm.”—p. 67.

Anecdote of Dogs.—“A lady, living in the neighbourhood of my own village, had some years back a favourite Scotch terrier, which always accompanied her in her rides, and which was also in the habit of following the carriage to church every Sunday morning. One summer the lady and her family were from home several weeks, the dog being left behind. The latter, however, continued to come to church by itself for several Sundays in succession, galloping off from the house at the accustomed hour, so as to arrive at the time of service commencing. After waiting in the church-yard a short time, it was seen to return quiet and dispirited, home. The distance from the house to the church is three miles, and beyond that at which the ringing of the bells could be ordinarily heard. This was probably an instance of the force of habit, assisted by some association of recollections connected with the movements of the household on that particular day of the week.

“The same lady has communicated to me an anecdote, somewhat similar to the above, but more extraordinary. This related to a poodle dog belonging to a gentleman in Cheshire, which it appears was in the habit of not only going to church, but remaining quietly in the pew during service, whether his master was there or not. One Sunday the dam at the head of a lake in that neighbourhood gave way, so that the whole road was inundated. The congregation in consequence consisted of a very few, who came from some cottages close by, but nobody attended from the great house. The clergyman informed the lady, that, whilst reading the Psalms, he saw his friend, the poodle, come slowly up the aisle dripping with wet, having swam above a quarter of a mile to get to church. He went into the usual pew, and remained quietly there to the end of the service.”—p. 70.

Anecdote of a Dog and Cat.—“The above lady has also given me the following anecdote of a dog and cat. A little Blenheim spaniel of hers once accompanied her to the house of a relative, where it was taken into the kitchen to be fed: on which occasion two large favourite cats flew at it several times, and scratched it severely. The spaniel was in the habit of following its mistress in her walks in the garden, and by degrees it formed a friendship with a young cat of the gardener's, which it tempted into the house,—first into the hall, and then into the kitchen,—where, on finding one of the large cats, the spaniel and its ally fell on it together, and without further provocation beat it well; they then waited for the other, which they served in the same manner, and finally drove both cats from the kitchen. The two friends continued afterwards to eat off the same plate as long as the spaniel remained with her mistress in the house.”—p. 71.

Black variety of the Water-Vole.—“We have an animal frequenting the fen-ditches of Cambridgeshire, and not very unfrequent, which the people sometimes call the ‘water-mole.’ This is nothing more than a black variety of the common water-rat, the fur of which is sometimes of as deep and velvety a hue as in the mole; but every gradation of tint may be found in different individuals between this uniform rich black and the reddish brown which more ordinarily prevails. There is no other difference whatever, besides colour, between these two kinds of water-rats, though the black has been considered by some as a distinct species.*

* See Macgillivray in Wern. Mem., vol. vi. p. 429.

"On the 15th of June, 1830, I had a very large female of the black sort brought to me, which had been killed in the next village: it was gravid at the time, and, on opening it, I found eight young within, perfectly formed, and apparently quite ready for exclusion.*

"I once at Ely found a small specimen of this black variety, measuring not quite five inches from the nose to the root of the tail, lying dead on the ground beneath the nest of a white owl. Like shrews, which are also often found at the foot of their nests, along with their casts, this rat appeared to have been caught and brought home by the parent owls to their young, but afterwards rejected."—p. 76.

Malformation in Rabbits' Teeth.—"Instances of the wild rabbit have occasionally been met with at Bottisham, in which the fore-teeth had grown to so great a length as to be rendered wholly unfit for the purposes they are intended to serve. This malformation is the result of the cutting edges of these teeth not being sufficiently worn down by use, or to the degree that they are in healthy individuals, and to supply which loss the teeth themselves are provided with the power of growth. But the original cause of the evil may vary in different cases. Thus, it may be due to one pair of incisors, or one single incisor, being broken, or having fallen out; to too soft food; to a morbid and too rapid secretion of the osseous matter of the tooth, which is constantly being deposited at its root; or to some slight derangement of the under-jaw, such as, for instance, a dislocation of one of its condyles, whereby the incisors of that jaw would be thrown out of their proper position, and their cutting edges could not be brought fairly into contact with those of the opposite pair. In all these cases, either the attrition of the teeth would be checked altogether, or their growth would be over-proportioned to their abrasion by the acts of gnawing and feeding, and a preternatural elongation of that part which is above the gums would immediately take place. It is obvious that this diseased growth will be more or less rapid according to the degree of influence exerted by the predisposing cause, and the length of time it has operated. Perhaps, in the first stage of the malady, its progress may be very gradual, and not much interfere with the usual habits of the animal; but the teeth having once attained such a length, that, under any circumstances, their edges cannot be brought to act upon each other, their growth must be much more rapid, and ultimately prove such an inconvenience as must often terminate in the starvation of the sufferer.

"In one rabbit, preserved in the Museum of the Cambridge Philosophical Society, the lower pair of incisors are so prodigiously developed as to turn completely over the nose, and to measure in length, from the surface of the gum to their cutting edges, no less than two inches and one-eighth; their usual length in ordinary individuals being only a quarter of an inch. In another rabbit, that occurred in this neighbourhood, but which was not preserved, both pairs of incisors had very much exceeded their usual length, there being also a great irregularity in their mode of growth. The lower pair, when viewed together, assumed the shape and appearance of the letter V, diverging from one another at the surface of the gum, and extending in opposite directions, to the length of nearly an inch and a half: the degree of divergency observed in the

* Mr. Jesse's "*sort of mole*, which partook very much of the appearance of a rat," is no doubt referrible to this black variety of the water-vole. See '*Gleanings*,' &c. (2nd Ser.) p. 27.

upper pair was nearly as great as this in the lower, and their length about the same, but their curvature very much greater, as indeed would necessarily result from the greater bend of that portion of the jaws in which these incisors are formed. In this instance, the portion without the gums had completed three parts of an exact circle, and their cutting edges were in close contact with the roof of the mouth.

"Both the above rabbits, when taken, exhibited the appearance of having been nearly starved to death, through an inability of procuring their usual food. In the first case, life had been sustained solely by the small quantity of herbage which the animal was enabled to crop with its lips at the sides of the mouth, which appeared to have been used for that purpose. In the second instance, even this method of feeding could scarcely have been resorted to with success; the rabbit being actually unable to close its mouth, from the pressure of the lower portion of the curve, formed by the upper incisors, upon the surface of the tongue." *—p. 78.

Note of the Pheasant.—"The common pheasant, as is well known, betrays the place of his repose by his reiterated crowing. The cock bird, for the hen appears to be nearly mute on these occasions, springs from the ground on to the tree selected for roosting, with a harsh scream that continues unremitted till he has assumed his perch; it is then softened into a more harmonious crow, consisting of two or in some cases three notes, which are repeated at intervals for a considerable time. Besides this cry, which is heard to a considerable distance, there is a weak inward noise immediately following, which sounds exactly like an echo of the first, consisting of the same notes, only in a different key, and uttered very softly. To hear this distinctly, it is necessary for the observer to be almost immediately under the tree on which the pheasant is perched. Some individuals crow in a much shriller key altogether than others: such, perhaps, are the young cocks of the year."—p. 100.

Equal distribution of Birds.—"There is, in this neighbourhood, an annual destruction of rooks and sparrows to a great extent every year; yet I observe, as others have observed before in similar cases,† that no apparent diminution of their numbers takes place. The rookery at Bottisham Hall is very large, and has existed from time immemorial; it appears to be the head-quarters, whence many small colonies, which are now established wherever there are a few tall trees in the surrounding neighbourhood, originally emanated. And to these head-quarters the inhabitants of the small scattered colonies appear to return in winter, flocking with the general mass, till the approach of the breeding season. The number of young birds in this rookery, either shot, or taken unfledged from the nest, has amounted in some years to nearly a hundred dozens; to say nothing of the old birds which are occasionally destroyed at all seasons of the year. Yet I feel satisfied that the general aggregate of the nests in spring, as also of the individuals forming the immense flocks we see in autumn, is much the same as it was thirty years back. So too with the sparrows, which abound in such multitudes, to the great annoyance of the farmer; they are not, to my thinking, more or less abundant than they were formerly, though here, as in other places, the parish officers give rewards for their destruction every year.

"My idea in regard of this matter is, that species, which, like the rook and sparrow,

* The above was first published in 'Loudon's Magazine of Natural History,' vol. ii. 1829, p. 134, with some further details and remarks here omitted.

† See 'Journal of a Naturalist' (3rd. edition), p. 183.

are generally dispersed over the kingdom, have a tendency to equalize their numbers throughout the different parts of it; deficiencies from accident, or any other cause, in one locality, being made up by supplies from another, in which there happens to be an excess. It seems also not improbable, that, without a diminution of numbers in any one place to induce strangers to settle there, the numbers in another are not allowed to increase beyond a certain limit, in consequence of the law which impels old birds to drive away their offspring, as soon as they are sufficiently matured to shift for themselves. If there be convenient space for them in the neighbourhood, without interfering with the old birds, they may be suffered to remain; but otherwise they are forced to go elsewhere; and if there is no colony near, allowing of increase, to which they can attach themselves, they found a new colony, wherever circumstances may be favourable to their so doing. In some instances, they may have to traverse long distances before they can effect this object; or they may be compelled to leave the country altogether, and resort to another; and perhaps this supposition may serve to explain the circumstance of their sudden appearance in some localities, where they had not been previously observed.* The well-known fact, too, of old birds driving away their young may, in the case of certain rare species, account for their being young or immature individuals, which alone occur, perhaps, at irregular intervals, in a given country. These individuals are such as have wandered to near the extreme geographical limits assigned to their species. If, from a general excess of numbers in other places, they are compelled to travel so far from central quarters as to overstep these limits, existence is with difficulty maintained, or may be no longer possible. They then perish; and it may be in this way that the numbers of some species are constantly held in check, or at least reduced, in certain seasons, when particular circumstances have led to an undue increase."—p. 107.

Anecdote of a Tame Barn Owl.—"White has mentioned a tame brown owl, with which he was acquainted.† A friend of mine has sent me the following particulars respecting a tame white one, which was taken, when young, from a nest in the woods at Dilstone, near Hexham in Northumberland, and given by a lady to her children, who brought it up. Great pains appear to have been taken to domesticate this owl, in consequence of which it became very familiar. In imitation of its own call, it received the name of *Keevie*, to which it would readily answer when within hearing, following the sound from whatever part of the premises it might happen to be in. Its usual place of repose during the day was under the branches of an old Scotch fir, which grew down a steep inaccessible bank, where it would sit apparently asleep, but sufficiently awake to endeavour to attract the notice of any one who passed, by its usual cry of *keevie, keevie*. If the passenger stopped and answered it, it immediately scrambled up the boughs of the fir, till it brought itself to a level with the walk above, in hopes of being fed; but if he went on again, unheeding its solicitations, it returned

* An instance of this kind is mentioned in the volume of 'Reports on the Progress of Zoology and Botany,' lately published by the Ray Society. "In April, 1838, a flight of rooks" is said to have "entered into the city of Danzig, and settling upon all the larger trees, in gardens as well as in the most crowded streets, built their nests there and brooded."—*Prof. Wagner's Report on Birds*, p. 71.

† Nat. Hist. of Selborne, Lett. XI. to Pennant.

to its former place, and resumed its slumbers. One of the most striking peculiarities in this tame owl is said to have been its fondness for music. It would often come into the drawing-room of an evening, on the shoulder of one of the children, and, on hearing the tones of the piano, would sit with its eyes gravely fixed on the instrument, and its head on one side in an attitude of attention; when, suddenly spreading his wings, he would alight on the keys, and making a dart at the performer's fingers with its beak, would continue hopping about, as if pleased with the execution.

"After a while the flights of this owl into the woods became longer, and he only returned at dusk to receive his usual supper from the person who was in the habit of feeding him, and whom he readily permitted at such times to take him up, and carry him into the house for this purpose. Bye-and-bye it was observed that he did not devour his meal in the kitchen as formerly, but fled along the passage, dragging the meat after him, till he reached the garden-door, when he flew with it to a part of the shrubbery: on being followed, it was discovered that he had brought with him a companion, who, not having courage to accompany him the whole way, remained at a respectful distance to receive his bounty. After having served his visitor in this manner, he returned to the kitchen, and leisurely devoured his own portion. This practice was continued for some months, till at length one evening he was missed, and nowhere to be found: his companion, it is said, continued to visit the spot alone for several weeks uttering doleful cries, but could never be persuaded to come nearer to be fed. It proved, in the end, that the favourite had been killed; and its stuffed skin was one day recognized, alas! in a woodman's hut, by the children who had so assiduously nurtured it and brought it up."—p. 122.

*Anecdote of a Redbreast.**—A lady has furnished me with the following striking instance of maternal affection in a redbreast, that had built in some ivy against a wall in a garden at Whitburn, near Sunderland, in April, 1839. The bird was sitting upon four eggs, when the gardener one day trimmed the ivy so close with his shears as almost to destroy the nest; in consequence of which the eggs were precipitated to the ground. They lay there till observed by the lady shortly afterwards, who was attracted to the spot by the plaintive cries of the parent bird. It was at first thought that to restore them to the nest would prove useless. The attempt, however, was made; the eggs, which were nearly cold, were picked up, and placed back again in the nest, after it had been repaired and put together again as well as was possible. They had not been returned to their former situation five minutes, when the bird came, and again took charge of them, and in two days they were hatched; the infant brood being from that time, of course, objects of daily interest and observation. Great was the dismay of the lady, some days afterwards, at finding all the little ones upon the ground, stiff and cold, having fallen through a fracture in the patched nest, which was not sufficiently strong to keep together. She took them up, and perceiving a slight movement in one of them, carried them into the house, where, partly by the warmth of the hand, and partly by the influence of a fire to which they were held, they all gradually recovered. They were then again placed in the nest, which was further patched with a piece of drugget, fastened into the fracture through which they had fallen. They were doomed, however, to go through more trials; for it happened,

* *Erithaca rubecula*, Swains.

some nights after, there was a heavy rain, which so completely soaked the nest, and the druggot which had been placed in it as a lining, that the young ones were found the following morning almost drowned, and to appearance lifeless. They were again brought to the fire, and thoroughly dried; after which they were placed in the empty nest of another bird that was substituted for the old one, and fixed in a currant-bush, a few yards from the wall where the ivy was. The young ones, which were half-fledged when they got this wetting, still continued to receive the attentions of their parents, and in due time they were all safely reared, and flew away. It is stated, that it was very curious to observe the familiarity of the old birds during the whole course of these proceedings: they always sat close by, and never seemed the least alarmed at the liberties taken with their progeny."—p. 127.

Rooks suck Birds' Eggs.—"May 12th, 1828.—Rooks undoubtedly suck partridges' eggs occasionally, since the keeper at Bottisham, who found that havoc had been made in that way by some vermin or other, lately set some traps near the nests and caught several.

"June 24th.—The men who are engaged in mowing the hay and clover, state that the rooks follow their movements, and fall to upon any nests which are exposed by the scythe, devouring the eggs without mercy, and carrying others away in their bills,—not sparing even those of the skylark. This singular fact, which they say they never observed in former seasons, seems to be a new circumstance in the history of the rook, and confirms what was recorded last month."—p. 147.

Food of Rooks in Winter.—"Dec. 30th, 1829.—Feeling some desire to know how rooks support themselves during severe frost, like that we have now experienced for this fortnight back, I caused one of these birds to be shot and brought to me. It appears that they manage to subsist well, notwithstanding the cold weather; for, on opening the body, we were surprised to find it in most excellent condition, with the stomach, intestines, and other abdominal viscera, completely covered with layers of fat. The stomach itself was unusually distended, and projected externally below the extremity of the breast-bone like a large egg. The contents proved to be turnip and wheat, mixed with a few gravels. The turnip was in a semi-digested state, but easily identified by the smell: the grains of wheat were whole, and scarcely at all altered. The stomach was completely full of this mixed food, and stuffed as tight as a pin-cushion."—p. 148.

Singular habit of the House Martin.—"Sept. 3rd, 1829.—House martins have a singular practice throughout the breeding season, and more particularly towards the latter part of it, of flying up against the walls of buildings, just below the eaves, and daubing them with mud, apparently without any intention of constructing a nest. Perhaps they do not go twice to the same spot: at any rate, these patches of dirt are not applied with any regularity, but may be seen sticking to the brickwork, at intervals of two or more inches all along the front of the building. Just at the present time, my own house has a line of these mud patches carried round nearly three sides of it. I fancy I notice, that the birds are more inclined to this sort of proceeding in some states of weather than others. Occasionally, twenty or thirty martins will be busily engaged in this manner from morning till night, when perhaps, for several days before and after, not one is to be noticed. A damp, cloudy day, especially if also warm, seems to call them most to this employment, during which they appear actuated by some feeling or excitement which it is difficult to explain. It is surely something more than an instance of their "caprice in fixing on a nesting-place" (alluded to by

White*), which induces them to "begin many edifices, and leave them unfinished. In the present instance, I suspect they may be the first broods but lately fledged, whose instinct begins to operate and show itself in this manner before it is wanted."—p. 161.

Singular Anecdote of a Ring-Dove.—"A singular circumstance occurred to my nephew one day last July (1845). As he was walking in the fir-plantations at Bot-tisham Hall, a ring-dove fell suddenly to the ground a short distance from him, as if wounded. On going up to it and securing it, he found it swarming with individuals of some species of fly, which, by his description, I have no doubt was a species of *Ornithomyia*, and which appear to have collected upon the bird in such numbers as quite to overpower it. It was a young bird of the year, but fully fledged, and had not fallen from any nest; neither did it appear to have sustained any injury in other ways."—p. 165.

The Collared or African Turtle.†—"The unfledged young of all the pigeon tribe are fed, as is well known, from the macerated contents of the crop of the parent birds, mixed with a curdy secretion of the crop itself. I am often much amused in watching the way in which this is effected in the instance of the collared or African turtle, of which I have several individuals in confinement. The old bird opening its beak to the full extent, the young plunges its own almost, as it were, down the throat of its parent, whose efforts to regurgitate the required food into the mouth of its offspring are distinctly visible. But what particularly takes my attention is the persevering and often fruitless endeavour made by the young to induce the parent to open its mouth for this purpose. This is especially the case when the young are now nearly fully fledged, and partially able to feed themselves; and when, perhaps, the usual secretions of the parent's crop are beginning to fail. Under such circumstances, they will often chase the old birds round the cage, and again and again present themselves before their face, as often as they turn away from their solicitations: at the same time they keep up a continual flapping with their wings, utter a plaintive whining note, and peck at the sides of their parents' bill, trying every stratagem to make them yield to their entreaties. The old birds, however, as if conscious that there was no supply, or that it was no longer needed, obstinately refuse to pay any regard to the demands made upon them; or they are not prevailed upon till after a long time, and till wearied, as it were, with the perpetual teazings of their offspring. The difficulty experienced by this last in effecting its object is greater as it advances to the age at which it is capable of taking care of itself. Probably the secretion in the parent's crop is dependent upon a certain degree of excitement caused by maternal affection; and, after a time, when this excitement wears off, by reason of the increasing age of the young bird, it is with difficulty elaborated. At length it ceases altogether; yet the habit of the young coming to its parent to be fed is kept up for a while, in like manner as we see nearly full-grown kittens and puppies still occasionally pulling at their mother's teats after they are dry. The scene above described may, at any time, be witnessed by throwing down a little hemp-seed into the cage where the parent and young birds are, when, as soon as ever the former begin to feed, the latter will be immediately at them importuning for a share."—p. 168.

* Nat. Hist. of Selborne, Lett. XVI. to D. Barrington.

† *C. risoria*, Auct.

Anecdote of a Pheasant.—"The cock pheasant sometimes exhibits marks of great daring and fierceness, even attacking man. I was once staying with a friend, who had a bird of this character in the plantations near his house, which was accustomed to make frequent sallies upon persons passing near the place of its resort. I saw it myself fly boldly at the proprietor of the grounds, who purposely approached the spot, in order that I might witness the extent of its courage and ferocity ;—it commenced pecking his legs, and striking with its wings, pursuing him for a considerable distance down one of the walks. He said that he generally carried a stick to beat it off, whenever he went that way. Some wood-cutters, who were at work close by, were in the habit of protecting their legs with strong leather gaiters from the attacks of this bird, which was constantly interrupting and annoying them in this manner."—p. 172.

Notes on the Diurnal Lepidoptera of East Lothian.—I procured a specimen of *Melitæa Selene* in July, 1845, by the banks of Neirraw burn, in this parish ; Kilmun, in Argyshire, is the only other Scotch locality yet known.

In the cold and cheerless month of October, 1838, I first obtained a specimen of *Vanessa Atalanta*, but I did not observe another until last September, when this fine insect appeared in great numbers in many neighbouring localities.

Through the great kindness of my friends, Mr. R. Greville, and especially of Mr. R. F. Logan, of Duddingstone, I have been enabled to arrange my collection of these insects, and the system of numbering each specimen when captured, has enabled me to draw up the following notes, which, I trust, may prove useful in extending the knowledge of the distribution of these insects in Scotland, where the cultivation of entomology is certainly at a very low ebb, and this neglect arises partly from the lack of illustrated works in our public libraries, and partly from the lamentable deficiency of our museums. It was only very lately that I became acquainted with students of this order, and under these circumstances, there was no other interest attachable to each specimen apart from the note of its capture and the fact of its being an addition to the fauna of our district, and there was no inducement to collect with assiduity ; hence my supply of duplicates is very poor.

As Mr. Logan has kindly revised the accompanying list, there will be fewer errors to correct, and the interest of the same will be greatly enhanced :—

Euclidia mi. Pretty common every year in the glen of the Whittingham water, near the Cairnhill : a notable day-flier, pretty common ; Pressmenan Copse, June, 1847.

Euclidia glyphica. Pretty common every season in June near the Cairnhill : an active day-flier ; new to Scotland.

Xylophasia combusta. Not uncommon : Pressmenan Copse, July, 1843 ; new to Scotland.

Eupithecia subfuscata. Rare : garden and neighbouring hedgerows ; August, 1842.

Xanthosetia ferrugana. Abundant : Pressmenan Copse, July, 1843 ; new to Scotland.

Xanthosetia hamana. One specimen : near Whittingham Castle, June, 1846.

Celæna Haworthii. Very rare : about thistles ; Traprain Law, August, 1842.

Eudorea murana. Not common : near the Caidon Hill, June, 1844.

Eudorea lineola. Very rare : one specimen ; on a window, June, 1846.

Euthalia elutata. A very singular variety, mayhap a new species, which shall shortly be sent to Mr. Doubleday, of Epping ; at sugar in the garden, July, 1844. The only *Geometrina* I ever took at sugar.

Graphiphora pyrophila. One specimen, in a bedroom here ; June, 1846.

Cnephasia octo-maculana. Pretty common : garden, July, 1846.

Polia chi. Rare : garden, and near Haddington, July and September, 1846.

Cleora Lichenaria. Rare : garden, and near Dunbar, June, 1846.

Mormo maura. Rare : on a window, August, 1845.

Charæas graminis. Rare : Traprain Law, August, 1842.

Ptychopoda immutata. Pretty common : garden, and neighbouring hedgerows, August, 1842 ; new to Scotland.

Orgyia antiqua. One specimen, on a window, September, 1846.

Lophoderus ministranus. Abundant Pressman Copse, July, 1842, and June, 1847.

On being informed by Mr. Logan, that *Graphiphora pyrophila* was a great prize, and having ascertained that the noble British Museum possessed no native specimen, I presented it forthwith, having no wish under these circumstances to see such a rarity in my poor collection. *Had not the collection of insects in the Edinburgh College Museum been completely closed against all students, the specimen should never have crossed the Tweed.*

I may possibly have erred in stating that several insects in the above list are new to Scotland ; I beg that any such error may be imputed to my want of access to good libraries, and not to any mean desire to rob Mr. Weaver, of Birmingham, or any other observer, of the credit of having previously noted the existence of any specimen.—*Archibald Hepburn ; Whittingham, June, 1847.*

Occurrence of Colias Edusa and Hyale.—Knowing that you feel interested in everything relating to the annual appearance of our two British species of *Colias*, I am induced to send you a line on the subject. I must first say that so many years have elapsed since I paid any attention to entomology, that I know not whether the insects are earlier than usual this season. On July 28th, 29th, 30th, and 31st, I saw fine fresh specimens of *Edusa*, and on July 28th and August 1st a good clear *Hyale* ; daily since I have seen many specimens. If you would like to know what number make their appearance here, or any other particulars, I shall feel much pleasure in supplying you with the information.—*Edmund Thomas Higgins ; Lyme Regis, August 9th, 1847.*

Barren Females of Acherontia Atropos.—Last summer I had several larvæ of *Acherontia Atropos*. The pupæ, with one exception, produced the perfect insects in a few weeks, and all the females were barren. A few days since the last moth came out, and is a fine female ; I opened the abdomen, and it contained no trace of eggs. I mention this, knowing that some persons imagine that pupæ which live through the winter produce fertile females. This, however, is not always the case, as is proved by this specimen, which remained rather more than twelve months in the pupa state. I may just say that the females of *Aplecta occulta* raised from the egg were barren.—*Henry Doubleday ; Epping, August 6th, 1847.*

Acherontia Atropos.—From six larvæ of this insect, I have reared only three good specimens, one having died in the chrysalis state ; and two, unable from some cause

to emerge, though well formed, I stripped off the dry shell, after which they died. I have stated (Zool. 1508) they all went into the mould about the end of July, 1846; one came out on October 11th. In November I took the others out of the mould, and put them into cigar boxes, lined with flannel or strips of list, and net over the front, placing the naked chrysalides on flannel at the bottom; these I hung up by one end, in a room occupied daily, where they remained till the warmer weather of spring came on, when they were removed to another room. On the 7th of the present month (July) one came out and crept up the list, where its wings freely expanded, and it became a beautiful insect. It was then placed alive in a larger box, when between eight and nine in the evening of the second day, it was heard fluttering about. Alarmed for the safety of my specimen, I immediately obtained a light, and on opening the box, it flew about the room; it exerted itself with considerable strength when caught, uttering sharply its peculiar cry; but as soon as possible I fixed the insect, and killed it, by holding its head in the steam from a boiling tea-kettle, first pinning it to a strip of wood to hold by. This is the quickest method I know, and it kills them without injury. The other came out during last night, the 25th instant. Both these insects, while in the chrysalis state, would frequently turn about in the box, and by breathing on them a few times, they would show, by moving, that they were alive.—*T. Goatley; Chipping Norton, July 26th, 1847.*

Capture of Deilephila Celerio at Brantingham Thorp.—On a recent visit to the garden of Captain Shaw, of Brantingham Thorp, near this place, Mr. Kingston, the head gardener, presented me with a fine specimen of the rare *Deilephila Celerio*, which was captured last summer in rather a singular manner on a plant of *Physianthus albicans* (albens), together with two specimens of *Sphinx Convolvuli*; some peculiar construction of the flower having closed upon the long proboscis, and so held them prisoners, where they were found fluttering about, but unable to escape. The plant was growing in the greenhouse, the doors of which were left open. Mr. Kingston told me that a great many other insects were caught on the same plant in the same singular manner.—*G. Norman; Hull, July 8th, 1847.*

Occurrence of the true Cerura bicuspis in Britain.—A male specimen of a *Cerura*, new to Britain, was captured near Preston by Mr. James Cooper, a most ardent and indefatigable entomologist, and to whose unwearied exertions we are likewise indebted for considerable additions to our knowledge of the nidification, &c. of our British birds. The insect in question was found upon an alder, having just emerged from its cocoon: there is little doubt of its being the genuine *bicuspis* of Hubner; the specimens hitherto so-called in this country being merely *farcula*: from this species it is totally distinct. Mr. Cooper most kindly presented this fine species to me.—*Henry Doubleday; Epping, August 6th, 1847.*

Capture of a new Psyche.—Mr. Ingall has captured a small *Psyche* with beautifully mottled wings: it is very different from the known British species, but in some degree resembles *Psyche undulella* of the continent: it is proposed to call the new species *Psyche retiella*.—*Edward Newman.*

Capture of Euchromia ericetana in the Isle of Wight.—I met with a specimen of this species on the 15th of July last at Shanklin, Isle of Wight; as I had only seen one specimen before, which I formerly named *ericetana*, I was desirous, if possible, of getting more specimens: on the 17th I succeeded in taking several, some in copula, and am now certain that this species is distinct from *E. purpurana*.—*W. Bentley; 3, Critchell Place, August 10th, 1847.*

Argyrotoza aneana.—This insect has been taken in profusion near the Willesden Station, on the London and North-Western Railway, in company with *Tortrix Viburnana*.—*Edward Newman*.

Bees destroyed by the Tulip.—The Rev. L. Jenyns, in his ‘Observations on Natural History,’ has noticed the fatal effects produced on bees by the blossom of the dahlia. The tulip appears to be equally noxious to these industrious insects; for should an unlucky bee chance to enter the cup of a tulip, it rarely, if ever, succeeds in getting out again, but struggles about in its prison for a short time, and then falls exhausted and dies, at the bottom of the flower. This is a fact well known to tulip fanciers, but it has not, I believe, been published as worthy of notice.—*Robert Cooper Douglas*; *Wolverhampton, July 12th, 1847*.

Swarming of Bees.—The following paragraph is extracted from the ‘Cumberland Pacquet’ for Tuesday, July 19th, 1847:—“Mr. Robert Longmire, of Troutbeck Bridge, near Ambleside, had no less than three hives of bees which swarmed on Sunday week, all of which *knit* in an apple-tree, and were safely secured in one large hive. On the next day a fourth hive swarmed, and the bees took possession of the same hive in which the three swarms of the preceding day are domiciled, all of which are evidently upon the best possible terms, and work contentedly and well together.”—*E. J. R. Hughes*; *Catharine Street, Whitehaven, July 19th, 1847*.

Captures of Hymenoptera and Coleoptera near Gravesend.—The following captures are, I think, worthy of record, as they will point out to the entomologist a locality for two or three very local insects.

Apion Limonii, on *Statice Limonium*, growing on the banks of the Thames, about a mile and a half below Gravesend; found about the end of June and during July. I have captured twenty-two specimens. Mr. Walton took this insect in abundance in 1841 at Holme-juxta-mare, on the coast of Norfolk, and Mr. Ingall, I think, took a solitary specimen last year in the Isle of Sheppey.

Polydrusus sericeus. Of this very local species I captured a fine series in the month of June, by sweeping the grass, &c. close to the water-side, in the same situation as *Apion Limonii*.

Smiera melanaris, Dalm. (*Smiera Macleanii* of Curtis). This insect is generally known as the supposed *Chalcis sispes* of Fabricius, which, however, is distinguished by having the petiole of the abdomen yellow: the *Smiera sispes*, or true “*Sphex sispes*” of Linnæus is rather larger than our species, and has red posterior femora. I captured both sexes of *S. melanaris*, the male not being previously known, as far as I can learn; it agrees with the female in colouring, &c. exactly. I took twenty-one specimens by sweeping the reeds and rushes that grow in the ditch which runs parallel with the footpath. Latreille says that these insects infest the *Stratiomydæ*, which are aquatic in the larva state; various species of *Stratiomys* abound in the above locality. *S. melanaris* is the species of which Mr. Ingall took three or four specimens in the Isle of Sheppey. *S. sispes* is very abundant.

I also met with several other scarce insects, as *Amalus scortillum*, *Pachyrhinus canaliculatus* and *P. leucogaster*, *Erirhinus Festucæ*, *Donacia nigra*, &c., also a few specimens of, I think, a new species of *Bagous*.—*Frederick Smith*; 5, *High Street, Newington*.

Capture of Coccinella labilis in Britain.—A specimen of this beautiful insect was taken by myself at Leominster, some years since, and placed with *C. septem-punctata* in the cabinet of the Entomological Club, where it has remained unnoticed, until Dr.

Schaum, who is now in London, obligingly called my attention to its specific characters: I hope to publish a detailed description in the September 'Zoologist.'—*Edward Newman.*

Remarks on three New British Coccinellidæ, together with Descriptions of two of them.

Coccinella labilis. Mulsant, Col. de France, iv. *Coc. 7-punctata*, Var. η . Steph. Illust. (Mand.) iv. 380.—Length $3\frac{1}{2}$ to $4\frac{1}{2}$ lines: black: head with two irregular cream-coloured blotches between the eyes, and a small streak of the same below them: thorax with a large cream-coloured patch on each anterior angle: elytra red, the two combined, with seven black spots, placed one basal and common, one very large on each elytron on the back near the suture, a small one towards the middle of, and near the outer margin, and a large one near the apex. Beneath with four large white spots, placed one on each anterior angle of the mesosternum, and one at each posterior angle of the metasternum, the latter spot united to a white space at the base of the abdomen. The anterior edge of the thorax is sometimes whitish; and the elytra have occasionally a small additional black dot on the shoulder. The two first coxæ have sometimes each a white spot in front.—Upon hunting over my various collections (containing Coccinellidæ), as I am forming some twenty-five or thirty illustrative ones, exemplifying metamorphoses, history, &c. of the useful or destructive insects, I have mustered up seven examples of the new British Coccinella, *C. labilis*, but which does not appear to me identical with the *C. magnifica* of Zeigler,—Redtenbacher, p. 24, whose specific character is "*Nigra, coleoptris totis rufis, maculis quinque magnis nigris: prima scutellari communi, subrotunda, secunda in medio ejusvis elytri juxta suturam transversa, tertia subrotunda ante apicem.*" By which it would appear that there are only five spots on both elytra combined; whereas our insect has seven. In his description of *C. 7-punctata*, he says, "*Coleoptris rufis, angulo scutellari flavo punctisque quinque nigris: primo scutellari communi subrotundo, duobus intra marginem ejusvis elytri et duobus in medio utrinque juxta suturam, humerali nullo.*" The spots, therefore, on Redtenbacher's *magnifica* and his *7-punctata* must differ in number, whereas in *labilis* and *7-punctata* they agree; the white spots on the breast seem to point out a good character for identifying the new species. I think there are two or three specimens in the British Museum collection, placed there by myself in 1816, when I arranged my own Coccinellidæ and the Museum collection to correspond, thirty-one years since. This insect is said to occur on the common asparagus.

Scymnus flavipes, Illig. Col. Bor. i. 413.—Somewhat hemispherical: shining black, with the mouth, antennæ, and legs, entirely luteous-red. (Length 1 line). Of this species, hitherto unrecorded as British, I have detected several examples in my collection, taken by myself near London.

Scymnus minimus.—A few days since I observed the leaves of an almond-tree in my garden to be perforated thickly by the attack of some insect, and upon looking over them I found them swarming (if the term may be allowed) with the pupæ of this species, of which I have reared many specimens. The debris of a minute coccus appears upon the leaves.

Plan for an Entomological Journal.—The circumstance of my examples of *Coccinella labilis* and *Scymnus flavipes* not having any tickets of locality attached, induces me to call attention to a simple method of keeping a journal of captures and additions

to a cabinet, which may readily be commenced and carried out by the merest tyro in the science. Most of the journals hitherto proposed pre-suppose the journalist to possess a slight knowledge of entomology; but the plan I suggest is unencumbered with any such supposition; and has the additional advantage of enabling the possessor instantly to refer to the capture, &c. of every individual example in his collection at any future period, notwithstanding the same may have been removed upon re-arranging "many a time and oft;" and a small book of a few leaves will serve for many years. Not so a journal of names; such a one I commenced in 1810, and have carried on to the present time, 1847!—very irregularly, in parts, it must be confessed, owing to the enormous quantity of entries, sometimes more than 3000 in a month!—till the number recorded has extended to between 30,000 and 40,000, a sad expenditure of labour, and from its extent comparatively useless.

According to the plan proposed, I assume the student takes up his subject in the beginning of July, and makes his first excursion on the 7th, on which day he captures some scores, or even hundreds, of specimens. Let him at starting be amply provided with boxes, to enable him readily to subdivide his captures, which he finds it convenient to do, as instanced, into nine sections, and on removing them from his setting-boards, then attach a corresponding number to every individual specimen, all taken from fungi bearing No. 2, and so forth. It then becomes evident on any future inspection of his collection, upon observing No. 1 attached to a specimen and referring to his journal, that it was obtained at Darenth by general beating on July 7th, 1847, and so on with the remainder: nay, his very duplicates will all become registered; as also his purchases, presents, &c., care being taken not to disturb the tickets. Again, by employing tinted paper, on which to write the Nos., the year may be subdivided into seasons: *e.g.*, pale-green for the months of March, April, May; pink for June, July, August; yellow for September, October, November; and white for the remaining months.

In addition to the journal, a Remark Book may be kept for the purpose of recording the habits, &c. of any particular insect, or of any special matters connected with collecting, &c.; which may be referred to by the original number, bearing in mind that whenever such particulars are intended to be recorded, the insect inviting such attention, must alone bear the No., as at No. 13.

No.	Whence, &c. obtained.	Time.	Remarks.
1	Darenth Wood	July 7, 1847	By general beating of herbage.
2	Ditto	"	From fungi (abundantly).
3	Ditto	"	" under flints, in chalk-pit.
4	Ditto	"	By beating the oak.
5	Ditto	"	" birch.
6	Ditto	"	" ash (two specimens only).
7	Ditto	"	" whitethorn.
8	Ditto	"	By sweeping grasses.
9	Ditto	"	Taken flying.
10	Greenhithe	8	" from under stones.
11	Purchased of A. B.	"	Who received <i>it</i> (or <i>them</i>) from Scotland.
12	Received from C. D.	10	" captured <i>it</i> (or <i>them</i>) at Charlton, on September 6th, 1846.

No.	Whence, &c. obtained.	Time.	Remarks.
13	Dulwich	July 13	Under bark of oak (One only, see Remark Book, No. 13).
14	Ditto	„	By sugaring trees (See Remark Book, No. 14).
15	Ditto	„	On Umbelliferæ.
16	Mr. E. F's Cabinet	14	Sold by auction, by G. H. —J. F. Stephens; Eltham Cottage, August 12th, 1847.

Entomological Captures by Samuel Stevens, Esq.

Pamphila Actæon near Weymouth. — This skipper, which has been so scarce for the last eight or ten years, I had the pleasure of taking on the 2nd of August last in plenty under the Burning Cliff, on the coast of Dorsetshire, between five and six miles from Weymouth; I found a few on the flowers of the thistle and ragwort, but most on those of a carex, which grew in clusters close to the beach; the insect was exceedingly local, being confined to a space of about one hundred yards. Mr. Dale, who kindly told me the locality, whilst on a recent visit to his house, has been to Lulworth (the original locality for the insect) for the last five years, and twice to this, without success, and it is now twelve years since he found it in plenty. I was a fortnight or three weeks too late, I regret to say, for I met with very few fine out of one hundred and thirty that I captured in five hours: those of my friends who are in want of the species, in fine condition, had better make early application.

Catocala sponsa and *promissa* in the New Forest. — On the 27th of last July, on my way to Dorsetshire, I stopped a night at Lyndhurst on purpose to sugar for the *crimsons*, and had what I considered excellent sport, taking nineteen tolerably fine specimens of *promissa*, but none of *sponsa*. I naturally thought for this latter species I must be too soon, so on my way home on the 4th of August I tried my luck again, and was rewarded by taking twenty of *sponsa*, mostly fine, and sixteen *promissa*, some a little wasted, making fifty-five in two nights. It is worth a journey to the New Forest alone to see two or three of these fine fellows on one tree at the same time. I missed a fine *Triphæna subsequa*; having taken this, last year, at Sherwood Forest, I am quite clear I was not mistaken.

Various Insects in the Isle of Portland. — On the 3rd of August last I paid a hasty visit to this island, and was rewarded in three or four hours, with capturing, amongst other Lepidoptera, —

Harpalyce Galiata. Four, seen in plenty.

Ennychia cingulata. Two, ditto.

Margaritia asinalis. Five.

Spilonota amænana? Nine, beat out of a creeping briar.

Carpocapsa pupillana. Twenty-one, beat out of the common wormwood, which abounds all over the island, but I could only find this insect in one spot, under the rocks.

Eudorea Portlandica. Two, seen in plenty. This may be only a local variety of *mercurella*.

Phycita binævella. Two.

Oncocera carnella. Nine.

Hipparchia Galathea, and *Polyommatus Corydon* and *Adonis* were in great numbers, and a few of *P. Alsus*.

I captured the above under the cliffs, on the south-east side of the island; there is great difficulty attending it, owing to the huge masses of stone lying about in all directions it is quite impossible to give chase, but one must content ones-self with catching what one can as they up from between the rocks. Entomologizing in this island is the most fatiguing I ever experienced.

On the Chesil Bank, in two hours, under stones, I captured amongst others the following Coleoptera; it is the richest locality for Harpalideous insects I think I ever met with:—

Dromius fasciatus. Six.

Licinus Silphoides. Three.

Harpalus serripes. Two.

„ *piger* and *anxius*. In plenty; and two or three other species.

Actephilus vernalis. Two.

Masoreus luxatus. Forty-four.

Micronyx Jungermanniæ. One.

Otiorhynchus rugifrons. Six.

Anthicus ater. Eight. And many others more generally distributed.

I regret I had so little time to investigate so rich and interesting a locality as this island, as I am certain, from its appearance, it would produce many rarities, and no doubt some novelties.—*Samuel Stevens; King Street, Covent Garden, August, 1847.*

Queries respecting Flies.—I wish to bring before the notice of your readers what appears to me rather a singular fact. The ceiling of the room in which I am now sitting has not, apparently, been whitened for the last three or four years, and it is, in consequence, neither so white nor so level as I take for granted it was when the operation of whitening it had just been performed. Sundry incipient crackings, one or two vestiges of recreation in the shape of black candle-marks, and other less artificial discolourations, effectually prevent the said ceiling from having anything like a monotonous appearance. The flies, also, have lent their aid in adorning it, and have left indubitable marks here and there of their having occupied the premises at no very distant period. But what I cannot account for, is this. These *fly-stands*, as I think we may call them, almost invariably are situated in those parts of the ceiling where the mortar has begun to crack, so much so, that one or two such localities have very much the appearance of a dingy milky-way. Other parts are comparatively if not altogether free. Can any of your correspondents tell me whether flies are generally thus discriminative in their favours, and, if so, can they suggest the reason why?

Now that I have the pen in hand, let me mention another question, to which I cannot find a satisfactory answer. How do flies manage to *settle* upon the ceiling? How they *keep* their position there it is supposed we know, but though I have watched I cannot ascertain with certainty how they *get* their position there. They fly, as bees,

wasps, beetles, and butterflies do, with the body nearly horizontal and the legs downwards. How then do they so suddenly and unhesitatingly pitch upon the flat roof of a room with the legs upwards? My notion, though, as I said before, I cannot satisfy myself of its correctness, is, that they first throw up the two fore legs and fasten them to the ceiling, much in the same way as we should throw up our arms in order to seize hold of a rope or horizontal bar above us. Then, I imagine, the body is wheeled up as on axis, and the other legs come into their proper and final position. Of course, considering the small size of the insect and the abundant practice he has, such a manœuvre could be easily accomplished with a rapidity that would baffle the scrutiny of any but the most accurate observers.

I need not apologize, I feel sure, to naturalists, for the apparent minuteness and triviality of these remarks. Such untrodden footpaths as these more often lead in Natural History to novel and important truths than the regular beaten highway.—*W. S. Lewis; Trinity College, Cambridge, August 17th, 1847.*

Capture of Cordulia arctica in Scotland.—As enquiry has been made in England, and on the continent, if I have again met with this insect, I have the gratification of recording in the pages of the 'Zoologist' that I took four specimens, one male and three females, in the Black Forest, in June last. It is the locality in which I captured the specimen that is in Mr. Dale's cabinet, and till now the only one known as British.—*Richard Weaver; Kinloch Rannock, July 15th, 1847.*

Insect Stratagem.—Yesterday, while walking on the cliffs near Barmouth, I witnessed a most amusing instance of insect stratagem. A grasshopper clinging to the stem of an *Orchis* (*maculata*?) attracting my notice, I stooped down to look at it, the insect perceiving my movement, adroitly wheeled round to the opposite side; upon my moving my head to that quarter it wheeled back, and upon my again moving it, changed its position, and did so repeatedly ten or eleven times; I put forth my hand to capture it, but it eluded my grasp and escaped.—*E. J. R. Hughes; Catharine Street, Whitehaven, June 30th, 1847.*

The Monkey and the Castanha Nut.—"Back of the house was a grove of fine trees, some apparently having been planted for ornament, others bearing profusion of various sorts of fruits. The one of all these most attractive was that which produces the Brazil-nut, called in the country castanhas. Botanically it is the *Bertholletia excelsa*. This tree was upwards of one hundred feet in height and between two and three in diameter. From the branches were depending the fruits, large as cocoa-nuts. The shell of these is nearly half an inch in thickness, and contains the triangular nuts so nicely packed that once removed no skill can replace them. It is no easy matter to break this tough covering, requiring some instrument and the exercise of considerable strength: yet we were assured by an intelligent friend at the Barra of the Rio Negro that the guaribas or howling monkeys are in the habit of breaking them by striking them upon stones or the limbs of iron-like trees. This friend related an amusing incident of which he had been witness, where the monkey, forgetful of everything else, pounding down the nut, with might and main, in a fever of excitement struck it with tremendous force upon the tip of his tail. Down dropped the nut and away flew monkey, bounding and howling fearfully. How long the victim was laid up by his lame tail our friend was unable to inform us; but we thought one thing certain, that

monkeys had changed since Goldsmith's day, inasmuch as at that time, as we are informed, the tip of a monkey's tail was so remote from the centre of circulation as to be destitute of feeling."—*A Voyage up the Amazon.*

The two supposed British Species of Marten identical.—"There are said to be two kinds of martens here, the pine-marten and the beech-marten; the former having a yellow mark on the breast, and the latter a white one. I do not, however, believe that they are of a distinct species, but consider the variety of shade in the colour of the breast to be occasioned by difference of age, or to be merely accidental, having frequently killed them in the same woods with every intermediate shade from yellow to white on their breasts; the animals being perfectly alike in every other particular. The oldest-looking martens had generally a whiter mark than the others, but this rule did not apply to all."—*Wild Sports in the Highlands,* p. 107.

Discrepancy in the Colour of Seals.—"Scarcely any two seals are exactly of the same colour, or marked quite alike, and seals frequenting a particular part of the coast become easily known and distinguished from each other."—*Id.* p. 226.

Supposed New British Seal.—The specimen in reference to which the following remarks are made was captured in the Orwell River, on the 29th of June, 1847. It was purchased by G. Ransome, Esq., and presented to the Ipswich Museum. Upon comparing it with descriptions of the Phocidæ in Professor Bell's '*History of British Quadrupeds,*' we found it not to correspond with the characters of any of the species therein noticed, which induces us to regard it as one entirely new to the shores of Britain. In colour it is of a uniform dark gray upon the upper parts of the body, becoming darker over the tarsal joint of the posterior extremities, the under parts being of a yellowish-white; irides dark reddish-brown. It measured about 3 feet 4 inches in girth, by 4 feet 4 inches in length.

Fig. 1 represents the skull, in which the orbits are observed to be very capacious: the anterior and inner margin being bounded by a line drawn perpendicularly downwards from the anterior extremity of the nasal bones, they will therefore be found to bear a greater proportion to, and encroach more upon, the superior maxillary bones, than the same parts in any of the figures given in Professor Bell's work.

Fig. 3 represents the palatine aspect of the skull, with the view of displaying the general arrangement of the teeth in the upper jaw. Considerable latitude of motion existed between the two inferior maxillary bones, and after careful maceration the bones displayed a very imperfect junction at the symphysis; the articulating surfaces being smooth and convex: the left inferior maxillary bone is quite perfect, and displays a single cavity for the reception of one incisor tooth; the bone of the right side is a little broken at the corresponding part, where a cavity for an incisor tooth may have existed. The dental formula in the present specimen appears to be as follows, —incisors $\frac{2}{2}$, canines $\frac{1}{1}$, molars $\frac{5}{5}$.

Fig. 4 is a front view, showing the disposition of the incisors and canines in the upper jaw. The specimen is evidently very young, as indicated by the condition of the bones in general, and by the teeth being very imperfectly fixed in their cavities.

All the teeth have but a single fang, except the posterior one on each side in the upper jaw, which has two: the fangs of all the teeth are tubular, open at their extremity, and were filled by a vascular pulp.—*W. B. Clarke; 14, Berner's Street, Ipswich, August 14th, 1847.**

* Reprinted from a private paper: the figures are necessarily omitted.—*Ed.*

Hair of the Roebuck.—"The difference in the colour and kind of hair that a roe's skin is covered with at different seasons of the year is astonishingly great. From May to October they are covered with bright red-brown hair, and but little of it. In winter their coat is a fine dark mouse-colour, very long and close, but the hair is brittle, and breaks easily in the hand, like dried grass. The roe sometimes take it into their heads to swim across wide pieces of water, and even arms of the sea. I have known roe caught by boatmen in the Cromarty Firth, swimming strongly against the current of the tide, which runs there with great rapidity."—*Wild Sports in the Highlands.*

Arrivals of Migratory Birds at Elveden, Suffolk.

1847.		1847.	
Wheatear.....	about March 23	Cuckow	about April 28
Lapwing	" March 23	Redstart.....	" May 1
Thicknee	" March 29	Spotted flycatcher	" May 5
Blackcap	" April 20	Turtle dove.....	" May 6
Nightingale	" April 24	Swift	" May 7
Swallow	" April 25	Goatsucker	" May 15
Sand-martin	" April 27	Sedge-warbler	" May 15
House-martin	" April 28		

—*Alfred Newton ; Everton, Biggleswade, July 28, 1847.*

Nidification of Birds at Elveden.

1847.		1847.	
Song thrush	about March 24	Ringdove.....	about May 12
Blackbird	" March 26	Cole tit	" May 12
Lapwing	" March 31	Ringed plover.....	" May 13
Stockdove.....	" April 3	Common snipe	" May 13
Hedge accentor	" April 16	Little grebe.....	" May 13
Pheasant	" April 16	Willow-warbler	" May 15
Jackdaw	" April 22	Nightingale.....	" May 15
Long-tailed tit	" April 23	Black-headed bunting ...	" May 15
Skylark.....	" April 26	Golden-crested wren	" May 16
White owl	" April 27	Lesser redpole.....	" May 16
Red-legged partridge ...	" April 29	Green woodpecker	" May 17
Wheatear.....	" April 29	Water hen	" May 17
Common partridge	" April 30	Blackcap	" May 17
Black and white wagtail	" April 30	Swallow	" May 20
Blue tit.....	" May 2	Yellow bunting	" May 24
Tree-creeper.....	" May 3	Spotted flycatcher	" May 25
Chaffinch	" May 4	Wryneck	" May 26
Thicknee	" May 4	Turtle dove.....	" May 27
Gray linnet	" May 4	Redstart	" May 29
Meapow pipit	" May 6	Stonechat	" May 30
Bullfinch	" May 7	Nightjar	" June 2
House sparrow.....	" May 7	Sand-martin	" June 5
Greenfinch	" May 8	Common martin.....	" June 6
Greater tit.....	" May 8	Yellow (Ray's) wagtail ...	" July 1
Kingfisher.....	" May 10		

The dates are those on which the birds respectively laid their first eggs.—*Id.*

Arrivals of Migratory Birds at Everton, Bedfordshire.

1847.		1847.	
Chiffchaff	about April 7	House-martin	about April 30
Nightingale	„ April 19	Ring-ouzel.....	„ April 30
Willow-wren	„ April 20	Blackcap.....	„ May 1
Redstart	„ April 21	Sedge-warbler	„ May 8
Wryneck.....	„ April 23	Swift	„ May 12
Lesser whitethroat.....	„ April 24	Wood-warbler	„ May 12
Tree pipit	„ April 29	Spotted flycatcher	„ May 13
Cuckow	„ April 29	Turtle dove.....	„ May 16
Swallow	„ April 30	Goatsucker.....	„ May 19

The dates of migration and nidification of birds at Elveden were recorded by my brother.

With reference to Messrs. Gurney and Fisher's question, by the 'barred wood-pecker' I mean the *Picus minor* of authors, that being the name applied to this species by Bewick, and also quoted by Mr. Yarrell as a synonyme.—*Id.*

On handling the Eggs of Birds.—There seems to be a very prevalent notion that the eggs of birds, if handled, will *certainly* be forsaken: that this may occasionally be the result I will not venture to deny, but that it is not so generally the facts I am about to adduce will clearly prove. In a thick bush in the shrubbery at Pentrapar, near Llandilo, I found a chaffinch's nest containing two eggs, one of which I took: the next day as I was passing I peeped into the nest, and found another egg laid; this I also removed, and put a small oval white stone in its place: on visiting it the following day, I found the stone ejected, and another egg laid, with which I did not meddle. In a wood at the Ferry side, near Caermarthen, I found a blackbird's nest with two eggs in it, one of which I removed: the next day I visited it, and, finding another egg laid, I pulled the nest off the fern-covered stump of a tree, where I found it, and took it home: the next day in my wanderings I had the curiosity to examine the site of the nest, and found there another egg laid: my unexpected success induced me to visit it again on the following day, when to my great surprise I found another egg; this was the last, the female bird being killed close to her nest that evening by a hawk. The nests of the greenfinch, yellow-hammer, goldfinch, whitethroat, thrush, wren, swallow, and many other birds, have I deprived of a portion of their eggs, and in every case has incubation proceeded. The like result has attended my handling the green linnet's eggs. This bird I have never seen described in any History of British Birds: in Wales I have repeatedly seen it wild and in captivity. In size and shape it agrees with the common linnet, but its plumage is greenish, a shade deeper than that of a male canary. It builds in hedges, preferring the centre of a whitethorn bush, and lays from five to six eggs.—*E. J. R. Hughes; Catherine Street, Whitehaven, June 8, 1847.*

[The term *green linnet* is usually applied to the greenfinch.—*Ed.*]

Enquiry respecting the rearing a Lapwing.—Could any of your numerous correspondents give me a hint as to the manner of rearing a young lapwing? If the kind-hearted author of the 'Wanderings' were to give a few hints respecting the treatment of this pretty stranger, he would gratify the enquirer, as well as the numerous readers of the 'Zoologist.'—*Id.*

Food of Birds of the Pie kind.—The 'Journal of a Naturalist' says, 2nd edition, p. 249, "The rook, the daw, the magpie, consume worms and grubs, and are not addicted, except from hunger, to eating other animal matters." We may presume this

ill-expressed sentence to mean, that the rook, &c., "eat other animal matters" only from scarcity of "worms and grubs." It is added in a note, "The magpie having young ones captures the new hatches of our domestic poultry; but these are cases of necessity rather than habit." My own observations have produced a somewhat different opinion as to the inclinations of birds of the pie tribe. Not only hawks, but rooks, and especially jackdaws, rob the wheat-ear traps of the shepherds, along the cliffs of the Sussex coast. Tame magpies and jackdaws will accept dead small birds which may be offered them, though I do not remember seeing daws do more than split the skulls to extract the contents. I have seen a wild magpie pursue a young chaffinch which could scarcely fly, and, after chasing it from the hedge, catch it on the wing, as if a butterfly, and immediately proceed to tear it in pieces. Very many years ago I shot a jay, to which my attention was attracted by the angry notes of a pair of chaffinches, and as the jay fell to the ground the hen chaffinch darted at (as if to strike) it. The bill of the jay was thickly clotted with fresh blood, and I have no doubt it had just devoured the progeny of the chaffinches, though I omitted to search for their nest. Once, in a retired lane, I came suddenly upon a jay, which was very busily engaged with a snake of some kind. I was not able to see what, but rather imagine it was a viper. Not only was the bird evidently intending to feed upon the snake, but it instantly flew off with its prey on being disturbed by my approach. Different members of the pie tribe will afford much entertainment when tamed, and allowed some degree of liberty. Daws do not perhaps acquire so many tricks as some others, but they will often be found very amusing. I have known one, which had the full use of its wings, and associated very generally with the pigeons, living in the same house with them without, to the best of my recollection and that of others, being accused of mischief among their nests, and carrying thither any plunder it might acquire, such as a silver pencil-case, or the like. This bird learned to imitate sundry noises, and was very fond of strutting up and down the ridge of a large barn, cackling precisely like a hen. But its most absurd feat was driving the dogs from their bones, which it accomplished by slyly pinching the dog's tail or a foot, and immediately taking flight when the other turned round. This persecution it would continue so perseveringly, that the dog invariably gave up the point and retired, when the conqueror would celebrate its victory by a peculiar chuckle of exultation. If another dog attempted to take possession of the bone, it was only to experience the same treatment; and the jackdaw would thus keep three or four dogs, one of them a large Newfoundland, completely at bay, until its attention was otherwise occupied. Another daw had a particular call of alarm, by which it would give notice to the dogs of a stranger entering the premises. I never had any opportunity of studying the habits of the jay, but can testify that the magpie is a very mercurial animal, in more senses than one. When a boy I possessed one, which copied the cough of an asthmatic old gardener so exactly, that members of the family were often deceived, when, wishing to speak to the gardener, and hearing as they supposed his cough, they walked up to the spot only to find, after some search, not the man, but mag perched in an apple tree. He was also an inveterate tormentor of one of my younger brothers, who at that period wore only socks, and the bird, having once made an attack upon the unprotected part of his legs, was for ever repeating the aggression, to the great terror of the child, who was continually driven into the house by the magpie flying to the assault, when he went alone into the garden or yard. Several years ago I brought up a young magpie, which, having been scared from the nest, I caught before it could fly; and as it was

impatient of confinement, after a very few days I clipped a wing, and turned it loose, when it proved extremely tame, and a most entertaining pet. It would come readily to my call, and climb all over me, in order to partake of my hard biscuit. It was soon upon the best possible terms with my dog, a mongrel terrier, which would even permit the bird to try, as if in jest, to take away the bone he might be gnawing; and frequently, when the dog was basking in the sun, flat upon his side, the magpie would pinch—in the most gentle manner—his tail, toes and ears, pick his teeth, and even poke his beak into the other's nostrils and ears, without the latter manifesting the slightest resentment, though he never could bear the bird jumping upon him, which he generally finished by doing, when he forthwith received "notice to quit," no doubt on account of the uneasiness occasioned by his claws. This bird often invited me to play at hide and seek with him, by darting backwards and forwards among the flowers in a very significant manner; his actions in which proceeding will, I imagine, explain another, which I have many times observed among his congeners. In some districts, where game-preserving is carried to a great extent, the race of magpies is nearly exterminated, and even in others it is much less numerous now than in my younger days. Still there probably are some parts of the country, where it may be yet possible, by watching, to see what I have been amused by, namely, the assemblage of a dozen or more of the birds in a field, when from time to time a party of three or four will start forth, hopping hither and thither, and changing places, precisely as if they were dancing a reel. In all these cases I conceive, from the frolicsome disposition displayed by my bird, that the others must be engaged in a game of play. In the 'Journal of a Naturalist' it is stated, as above, p. 189, that the magpie "generally lays eight or ten eggs;" but from my own recollection, aided by enquiry, I should say that the number is rather over-rated, six or seven being the usual amount, though sometimes eight might be found. My last bird was very useful in destroying grubs, wood-lice, and the like, in the garden, though he found too much amusement in pushing off my apples. However I regretted much when he met the usual fate of such pets, an untimely end.—*Arthur Hussey; Tonbridge, August 14, 1847.*

Remarks on the Nests and Eggs of the Wood-Warblers.—I have now before me the nests of these warblers, which were found during the early part of the present month; and as they bear considerable resemblance in their general formation, probably an account of their respective differences may not be unacceptable to some of your readers. The nest of the wood-warbler (*Phyllopneuste sylvicola*) is more loosely constructed than those of its congeners, and it differs somewhat in being more oval in form. The outer materials of which it is constructed consist of moss, dead leaves, and the culms of our coarser grasses. The lining is formed of fine grasses, with the addition of a few hairs. The total absence of feathers readily distinguishes it from the nests of its two allies. The nest of the chiffchaff (*P. hippolais*), though outwardly constructed of similar materials, is more compact in form, and the tiny architect usually lays a substantial foundation, previously to constructing his fabric. The interior of the nest is lined with the more slender of our grasses, chiefly the *Agrostidæ*, a few soft feathers being substituted in place of hair. The nest of the willow-warbler (*P. trochilus*) is intermediate in structure, neither so neat as that of the chiffchaff, nor so carelessly put together as that of the wood-warbler. Its interior is formed of feathers and dry grass, as is the case with that of the chaffinch, though probably the feathers predominate in the nest of the willow-warbler. The eggs are readily distinguished: those of the wood-warbler are much the largest, and are thickly mottled with dark purple; those of the willow-

warbler are next in size, and are spotted with rusty red. The markings of the egg of the chiffchaff sufficiently characterize it; they are of a vinous purple, and are sparingly disposed in large blotches, chiefly confined to the broad end of the egg.—*Peter Ingham*; *Storthe's Hall, Huddersfield, June 8, 1847.*

Miscoloured Thrush's Eggs.—In 1845 I found a thrush's nest, in which were two eggs of the usual colour, and two white with dark red spots. The nest was unfortunately destroyed before the eggs were hatched.—*E. Peacock.*

Habits of the Water-Ouzel.—"At other times the water-ouzel walks deliberately off his stone down into the water, and, despite of Mr. Waterton's strong opinion of the impossibility of the feat, he walks and runs about on the gravel at the bottom of the water, scratching with his feet among the small stones, and pecking away at the small insects and animalcula which he can dislodge. On two or three occasions I have witnessed this act of the water-ouzel, and have most distinctly seen the bird walking and feeding in this manner under the pellucid waters of a Highland burn. It is in this way that the water-ouzel is supposed to commit great havoc in the spawning-beds of salmon and trout, uncovering the ova, and leaving what it does not eat open to the attack of eels and other fish, or liable to be washed away by the current; and, notwithstanding my regard for this little bird, I am afraid I must admit that he is guilty of no small destruction among the spawn."—*Wild Sports in the Highlands*; p. 198.

Nesting of the Tree Sparrow in Oxfordshire.—I beg to forward a notice of the nesting of the tree sparrow in Oxfordshire. The nest was found by myself upon May 22nd, and was built at the end of a small hole in the top of a pollard willow. It contained five eggs. The nest was domed over, composed of the flowering tops of a kind of reed, and thickly lined with feathers. A few days previously I procured some eggs, taken out of the thatch of a building, which I doubt not belong to the same species. The bird is a winter visitant to this part of the country during severe weather. Great numbers were observed during the past winter, but none in that of 1845-6.—*H. Roundell*; *Tringford, May 25, 1847.*

Occurrence of the Cirl Bunting at Selborne.—On Saturday evening last, as I was walking round my grounds here, I was struck by the manners of a pair of birds, which were evidently endeavouring to attract the notice of my dog, and to draw him away from their young. On approaching them, I found to my delight that they were a pair of cirl buntings (*Emberiza Cirlus*), and that they had a brood of full-fledged young, which were apparently feeding in some cut vetches lying in the neighbouring field. It is evident that they have had their nest close at hand, as I have since never failed to find them on the trees near the fence, at the same spot, whenever I have visited the place. I have this morning seen five or six, including the parent birds; and the latter are so tame that they will sit on the rail, within three or four yards of us, for a considerable time, affording every opportunity of observing their beautiful plumage. The young are more shy, but the beautiful and gay cock bird is exceedingly tame. As I do not allow a gun to be ever fired in my little park, I cannot but hope that these interesting birds may become permanent denizens of the place. I thought you would be pleased to have a notice of this addition to the Selborne Fauna. In good old Gilbert White's time the bird was not known to be British, having been discovered by Montagu in 1800.—*Thomas Bell*; *Selborne, July 12, 1847.*

Tyneside Naturalists' Field Club; *Occurrence of Sylvia Turdoides near Newcastle.*—At one time Prestwick Car was not preserved, and water-birds were driven away,

and the shells on which they fed were abundant, but now that the place is strictly preserved, the birds abound, and the shells appear to have become scarcer. Water-birds, as might be expected, have resorted in greater numbers to the Car, since they have been less disturbed, and this year they appear to be more numerous than usual. Several species also have bred in greater numbers this season than usual, and some have bred which had not been previously noticed at the Car in the breeding season. Several broods of the redshank were brought out, the water-crake bred there this season, and a ruff and reeve were seen by Mr. R. Reay, of Berwick Hill. Mr. John Hancock, by whom this information is furnished, obtained the egg of the redshank. Amongst the other birds seen was a flock of about thirty ring-dotterels, a number unusually large to be seen together at Prestwick Car. The only business transacted at the meeting was the election of four new members, and the presentation, by Mr. J. Hancock, of a Notice of the Capture of the Thrush Nightingale (*Sylvia Turdoides*, Meyer), the largest European warbler, near the village of Swalwell, three or four miles west of Newcastle. The attention of Mr. Thos. Robson, of Swalwell, a gentleman perfectly acquainted with the notes of our different warblers, was, towards the end of last May, attracted to a note which he did not recognize. After some trouble he succeeded in seeing, and afterwards obtaining the bird, which proved to be the male of the species above named. Although this was the only specimen obtained, yet, from the time of year and other circumstances, there is little doubt that this fine warbler is a regular visitant, its peculiarly retired habits having hitherto concealed it from observation. Mr. Hancock has in his possession an egg obtained in Northamptonshire, which agrees exactly with the description of the thrush nightingale's, but from not supposing the bird to be a native of England, Mr. Hancock was unwilling to assign the egg to this species; now, however, that the bird has been obtained here in the breeding season, there seems no reason to doubt that it breeds also in Northamptonshire.

Partridge destructive to Eggs.—A friend of mine, who was much troubled by vermin, set two traps, a short space from each other, with a very slight fence on either side to guide the animals to them. Between the traps he made a slight depression, in which some eggs were placed as a bait: instead, however, of catching the vermin, he caught their game, and to his annoyance found the leg of a partridge in one of the traps. A few days afterwards he caught a French partridge in the same way. It may be thought these birds accidentally entered the traps, but my friend assures me that the eggs showed many marks of their bills, from which it is evident they were attracted by them, and had been some time engaged at their work before they were caught.—*T. Catchpool, Jun.; Colchester, August, 1847.*

Note on the Common Sandpiper and Woodcock.—While fishing yesterday in the River Bure, near Wroxham, I was much struck by the number of the common sandpiper (*Totanus hypoleucos*) which I saw flying up and down; there were many family parties of five or six, but on two occasions I saw a flock of as many as thirty or forty together close by me. I do not remember to have seen any notice of any flocking together of more than one family of that species. My companions, who are constantly in the habit of fishing thereabouts, tell me that they never observed the bird there at all, and, though not ornithologists, it could not have escaped the notice of both of them were it common. On the same day I saw a woodcock taking its evening flight, either a very early immigration or bred thereabouts; I fancy the latter, as I have reason to believe that they do nest in Norfolk. One was shot at Mr. Marsham's, of Stratton, on the 4th of June this year, if my memory serves me; certainly some time in that month.—*H. T. Frere; Aylsham, August 25, 1847.*

Migration of the Woodcock.—Mr. St. John supposes that there is a partial migration of those woodcocks that remain and breed in the north of Scotland. "At any rate," says he, "they entirely disappear from woods where any day in June or July I could find several brace. In September and the beginning of October I could never find a single bird, though I have repeatedly tried to do so."—p. 222. "An intelligent master of a ship once told me that in his voyages to and from Norway and Sweden, he has frequently seen them (woodcocks) tired and exhausted, pitch for a moment or two with outspread wings in the smooth water in the ship's wake, and, having rested themselves for a few moments, continue their weary journey."—p. 221, '*Wild Sports in the Highlands.*'

Occurrence of the Ruddy Sheldrake (Tadorna rutula) in Ireland.—"I learn by letter from T. W. Warren, Esq., of Dublin, that he has lately added to his fine collection of rare birds obtained in Ireland, an example of this species. The bird, on the second day after being killed, was presented to Mr. Glennon, bird-preserver, by Mr. John P. Prendergast, whose letter respecting it was kindly sent for my perusal. It was there stated that the bird was shot on the Murrough of Wicklow,* on the 7th July, 1847, by Mr. John Moreton, of that town. The abode of this species in Europe is in the more southern portion of the eastern countries; the individuals met with in the western parts are considered only accidental visitors: three have been obtained in England."—*W. Thompson, in Ann. and Mag. Nat. Hist.* xx. p. 171.

Occurrence of Baillon's Crake (Crex Bailloni) in Ireland.—"By letter from Dr. Harvey, of Cork, dated January 13, 1847, I was kindly informed that he had at that time in his possession—temporarily—a specimen of this bird, which was taken in a bog at Clay Castle, near Youghal, on October 30, 1845. It was also remarked that the spotted crake (*Crex porzana*) was obtained in the same locality in October, 1843. Dr. Harvey subsequently, at my request, favoured me with a description of the specimen of *C. Bailloni* as to dimensions and colour. On applying the description to specimens in the British Museum and in Mr. Yarrell's collection, there was a perfect agreement, except in one particular, the white markings being in some parts of the plumage of the few specimens examined disposed in the form of streaks, which they were said not to be in any part of the individual obtained in Ireland. The specimen belongs to Mr. Samuel Moss, of Youghal.

"The *Crex Bailloni* has occurred at various seasons in different parts of England, and is said to breed in some of the northern provinces of France; hence we should expect its occasional appearance in Ireland."—*Id.* p. 169.

Occurrence of the Whiskered Tern (Sterna leucopareia) in Ireland.—"When in Dublin in the month of March last, I saw in the collection of T. W. Warren, Esq., an adult specimen of this very rare tern, which was shot in September, 1839, 'on the river Liffey, between Ringsend and the Pigeon House fort, Dublin bay,' by John Hill, Esq. This gentleman, from shooting much at one period in that bay, and being much interested in scarce birds, obtained some species of the greatest rarity.

"The *S. leucopareia* was discovered by M. Natterer, of Vienna, in the south of Hungary, and inhabits chiefly the eastern portion of the south of Europe. It has very

* "This is an extensive sandy tract bordering the sea near the town of Wicklow; such a locality as is resorted to by the common sheldrake (*T. vulpanser*) for the purpose of breeding."

rarely occurred in the more western countries of the continent. Temminck, when first publishing the species (1820), mentioned that M. de la Motte, of Abbeville, had on one occasion seen several individuals, and killed three of them in a marsh on the coast of Picardy, in France. But one individual—killed at the end of August, 1836, at Lyme, in Dorsetshire—is noticed in Yarrell's 'British Birds' as having been obtained in England. Specimens of this bird in the British Museum are labelled 'Hydrochelidon * hybrida, India? Hardwicke bequest,' and 'Cape Seas, Dr. Andrew Smith's collection.' If, as quoted by Schlegel (Revue Crit. Ois. d'Eur. cxxxi.), this be *S. hybrida* of Pallas, that name has the advantage of priority."—*Id.* p. 170.

Occurrence of Sterna velox in Ireland.—"In March last I had the opportunity of examining, in Mr. R. Ball's possession in Dublin, a specimen of a tern, the species of which I did not know. It was left at my friend's house early in the month of January, and evidently had been but recently skinned. Mr. Watters, jun., to whom the specimen now belongs, and who has commenced forming a collection of native birds, which comprises some of the rarest species, assured me that he saw it in a fresh state, and that it was killed near Sutton—a place on the road between Dublin and Howth—at the end of December, 1846: two others of the same species were stated by the shooter to have been in company with it. As the bird was unknown to me, I noted down the following particulars of it, which are here given that others may have an opportunity of forming their judgment upon the species:—

	in.	lin.
Length, total (stuffed), to end of longest tail-feathers	20	3
—— of bill above from forehead to point	2	6
—— of bill from rictus to point	3	4
—— of wing from carpus	13	9
—— of tarsus, about	1	0
—— of middle toe to base of nail.....	0	11
—— of nail itself, measured in a straight line, about.....	0	4

Wing and longest tail-feathers about of equal length; outer or longest tail-feathers exceed the middle by three inches. Bill wholly yellowish horn-colour; legs and toes wholly black. Colour of entire plumage the same as that of the common tern (*S. Hirundo*), but the back is rather of a darker shade than that of the latter when adult. The black of the head does not reach within one-third of an inch of the bill: space between the termination of the black plumage and the bill, pure white. The specimen is evidently adult.

"On visiting the collection of birds in the British Museum, where the utmost facility for reference and comparison has always been most kindly afforded me by George R. Gray, Esq., I saw the same tern labelled '*Sterna velox*, Ruppell, Red Sea.' It was from this locality that Ruppell had the species which is figured in his '*Atlas*,' pl. 13 (1826). To Prince Bonaparte it is not known to have occurred farther west in the Mediterranean than Sicily, and so far only accidentally. The *Sterna cristata* described by Swainson in his '*Birds of Western Africa*,' p. 247, pl. 30, agrees in all details with my notes of *S. velox*, except in the colour of the back, which is said to be almost as white as the under parts.—*Id.*

Habits of the Tern.—"The terns which breed in the islands on a loch in the woods of Altyre, fully five miles in a straight line from where they fish, fly up to their young with every sand-eel they catch. I have seen them fly backwards and forwards in this way for hours together, apparently bringing the whole of their food from the sea, notwithstanding the distance; their light body and long swallow-like wings make this long flight to and fro less fatiguing to the tern than it would be to almost any other bird."—*Wild Sports in the Highlands*, p. 201.

Living Toad imprisoned in Stone.—A few days ago two labourers, employed at a stone quarry at Frodingham, near Brigg, Lincolnshire, found, at a depth of five feet below the surface of the ground, and between two blocks of stone (lias), a living toad: the interstice between the stones was filled with yellow clay, and there did not appear the least possible aperture by which anything could have passed.—*E. Peacock*.

Occurrence of the Natterjack at Selborne.—Observing, a few days ago, a toad poking his nose from under a stone on the peach border in my garden, I took him up, and found him to be the natterjack (*Bufo calamita*). I replaced him, and he continued to inhabit the same retreat for some days, until he was fairly "burnt out" by the heat of the sun. It was a strange place for a beast of this description to choose for his hiding-place, under a wall exposed without shelter to the direct south, in such weather as this: very different from the

"Toad that under the cold stone
Days and nights has thirty-one!"

This is another addition to our local fauna.—*Thomas Bell*; *Selborne*, July 12, 1847.

Young of the Natterjack.—At a recent meeting of the Surrey Natural-History Society, Mr. Henry Bull, of Godalming, exhibited specimens of the young of the natterjack, found by himself on Shalford Common, where this reptile is abundant.

Occurrence of the Argentine (Scopelus borealis) at Killiney Bay.—"A specimen of this extremely beautiful little fish was found in a dying state on the beach at Killiney Bay, near Dublin, by Professor Oldham, on the 11th of March, 1847. It was shown to me on the following morning in Dublin by that gentleman, who subsequently deposited it in the Museum of Trinity College.

"This specimen is $2\frac{1}{2}$ inches in total length, and so fully agrees with that described and figured by Dr. W. B. Clarke, in the second volume of Charlesworth's 'Magazine of Natural History' (1838), as to render any description unnecessary. It having been dried up before being transferred to spirits, a positive enumeration of the rays in the fins is impracticable, but they are in all the fins about the number given by Dr. Clarke: the anal fin, however, extends considerably farther along the body (for $4\frac{1}{2}$ lines) than represented in his figure, although it there appears as extending to twice the length that it does in Pennant's fish. It commences in the specimen under examination, as

Dr. Clarke and Mr. Yarrell (B. F. vol. ii. p. 164, 2nd edit.) figure it, in a line with the last *gutta* of the upper row, but extends as far as the first *gutta* on the ventral line beyond the vacant space. The *guttæ* in all the series are—what I did not anticipate—precisely in number as in Dr. Clarke's specimen, and even where he remarks that one 'appears to have been obliterated' in the row of the smallest *guttæ* extending from the commencement of the anal to that of the caudal fin, it is wanting on both sides of the specimen under examination. See Dr. Clarke's paper, p. 23, and Yarrell, p. 164, for a detailed notice of these *guttæ*. Some writers on the argentine—as Dr. Clarke at p. 23, and Mr. Yarrell at p. 25 of the same volume, in his remarks on that gentleman's communication—seem inclined to believe that among the very few examples of this fish obtained on the British coasts, two species have been taken. The anal fin certainly is very short in Pennant's *figure*, but the author himself is silent respecting the fin and its number of rays, so that we have only the engraving on which to form a judgment. By making fair allowance for the injury that may have occurred to the very delicate and fragile fins of this species, and for a due want of critical accuracy in the draughtsman and engraver, there is not, in my opinion, sufficient reason for believing that the argentines hitherto noticed as taken in the British seas were of more than one species, nor, judging from Nillson's description of the specimen taken on the coast of Norway, do I see reason for considering it as distinct. This author refers Pennant's fish to his *Scopelus borealis*.—*W. Thompson, in Ann. and Mag. Nat. Hist.* xx. p. 171.

Description of a new Ray.—"A few days ago Mr. Whiteside found on the shore at Rapid Bay the carcass of a fish of a most extraordinary description. It was too large for him to drag away whole, and was also in a very putrid state. He preserved, however, a part of its head and a part of one flapper, which we have seen. These and the rest we will describe in the best way we can from his description, premising that Mr. Whiteside has made arrangements for the remainder of the fish being brought up to a neighbouring station, and the bones preserved. The creature is a flat fish, with a head shaped something like that of a fox, near the back on each side of which large eyes protrude. The nostrils and mouth are directly underneath. The length of the head to the tip of the nose is about nine inches, and its breadth behind the eyes one foot. The body is about three feet long by one broad, and has on each side a flapper of about two feet long by a foot and a half broad. From the body proceeds a tail four feet in length, on each side of which, at its junction with the body, springs a bony substance, eighteen inches long, terminating in what resembles the bowl of a ladle. The tail is armed all along, on each side, with strong ivory teeth, set on with large roots, like the thorns of a rose; and within the flappers are treble rows of ivory teeth, resembling fish-hooks, each extremely sharp and barbed at the point. These we saw. But the most curious part we have yet to describe. It is the mouth, which measures five inches across, and has two lips, if they may be so called, each of which is covered with round sharp teeth, of about a quarter of an inch long. On each are twelve rows of about thirty-six teeth. Mr. Whiteside has not met with any one to whom the species of fish was known; but it seems pretty clear to us that it lives upon shell-fish, which its remarkable teeth would enable it to grind up, while the spikes on the tail and flappers would serve to attach it firmly to the sea-weeds, which abound in the part where it was found, and the ladle-like paws would probably be used to tear the shell-fish from the rocks and collect them for its food. The appearance of its outer skin is exactly that of a light brown New Zealand mat; the threads and cross stitches may be

distinctly traced. Some of the outer teeth are much ground down and quite blunt. The inner ones are as sharp as needles."

The foregoing description is from a newspaper received not long since from Adelaide, in Australia; and the fish described, which appears to be a species of eagle ray, is probably new to science.—*Jonathan Couch; Polperro, August 5, 1847.*

Bird-catching Spider.—At Quibe I saw a bird-catching spider (*Mygale*), of extraordinary large size. The back part of the body alone measured two inches. Being at some distance I supposed it to be one of the rodent animals, and I fired at it. To my mortification I discovered my mistake when too late, for the specimen was completely destroyed by the shot, and was useless for my collection. The Indians assured me that on the margin of the stream which flowed near the plantation many larger individuals were to be found; but I never saw another of such remarkable size as the one I inadvertently destroyed.—*Tschudi's Travels in Peru.*

Capture of Lepidoptera near Yaxley, in Huntingdonshire, from the 12th to the 20th of August.

Agrotis cunigera. At sugar, sparingly.

Graphiphora subrosea. At sugar and on flowers, plentiful, but not one in a dozen fine; it fades very much after it is dead.

Mamestra nigricans. Six specimens, at sugar; a new locality for this insect.

* *Nonagria neurica.* One female, at sugar.

Leucania musculosa. Sparingly, at sugar and on flowers.

* *Leucania Helmanni.* Sparingly, at sugar.

Plusia Festucae. At sugar.

Acosmetia rufula. Flying at night, not uncommon.

The two species marked thus * have not, I believe, been described in any work on British entomology.—*Fredk. Bond; Kingsbury, August 28, 1847.*

Capture of Lepidoptera near Bristol.

Xylina petrificata. One, April 8.

Orthosia munda. Four, April 21 to 30, at sugar, Leigh Woods.

Drymonia chaonia. One, April 23, Leigh Woods.

Demas Coryli. One, April 26.

Triphosa cervinata. Three, May 3, attracted by light.

Geometra illustraria. One, May 21, attracted by light.

Eupithecia strobilata. Abundant, May 5 to 13, Durdham Downs.

Phibalapteryx Vitalbata. Abundant, May 8 to 31, Durdham Downs.

Leiocampa dictæa. Seven, May 22 to 31.

Hadena Genistæ. Three, June 3, Durdham Downs.

Xerene adustata. Abundant, June 7, Durdham Downs.

Bradyepetes amataria. Common, June 18, Durdham Downs.

Thyatira batis. One, June 28, Durdham Downs.

Pseudotomia Trauniana. Four, June 15, on walls.

- Grammesia trilinea* and *bilinea*. Several, June 5 to 9, attracted by light.
Eurymene dolabraria. One, June 18, attracted by light.
Leucania comma. One, June 21, attracted by light.
Cerura bifida. One, June 23, attracted by light.
Cleora bajularia. Five, July, Durdham Downs.
Pterophorus tetradactylus. Abundant, July, Durdham Downs.
Pterophorus microdactylus. Abundant, July, Durdham Downs.
Agrotis corticea. Six, July, attracted by light.
Trochilium Ichneumoniformis. Eight, July, Durdham Downs.
Thyatira derasa. Two, July, Durdham Downs.
Emmelesia Blomeri. One, July, Durdham Downs; one, Leigh Woods.
Hipparchus papilionarius. Four, July, Durdham Downs.
Pericallia syringaria. Three, July, Durdham Downs.
Scopula hyalinalis. Abundant, July, Durdham Downs.
Scopula margaritalis. Three, July, attracted by light.
Scotophila porphyrea. One, July, attracted by light.
Plusia Iota. Abundant, July, attracted by light.
Eupæcilia sodaliana. Four, July, Durdham Downs.
Charissa dilucidaria. Common, July, Durdham Downs.
Ptychopoda incanata. Three, July, Durdham Downs.
Margaritia asinalis. Common. July, Durdham Downs.
Porthesia chrysorrhæa. Four, July, attracted by light.
Hemithea vernaria. Common, July, Durdham Downs.—*P. H. Vaughan; Redland, near Bristol, August 25, 1847.*

Larvæ taken at Sugar.—Not being aware that it has been noticed that sugar is attractive to Lepidoptera, in the caterpillar, as well as in the perfect state, I beg to say that I have captured several larvæ this summer (*Polia nebulosa*, *Orthosia instabilis*, *Cosmia trapetzinga*, and others) eating the sugar that I had placed on trees to attract moths. That larvæ are fond of sugar seems certain, for on my giving some to several broods I have had during the summer, they generally greedily devoured it; but whether it is really attractive to them I cannot determine: I should be glad to hear if any of your correspondents have found it so.—*Id.*

Capture of Lepidoptera in 1847.

- Hipparchia Typhon*. This in my opinion is a variety of *H. Davus*. I took specimens in Arran which connect the Rannoch with the Cumberland variety.
Ægeria Bembeciformis. Carlisle, August 16.
Demas Coryli. Pass of Killierankie, Scotland, May 28.
Harpalyce ruptata and *albocrenata*. Evidently varieties of one species. Rannoch.
Hadena rectilinea. At sugar, and resting upon walls, palings, &c., June 14 to 30, Rannoch.
Acronycta Euphorbiæ. At sugar, and resting upon walls, palings, &c. I also bred this species.
Acronycta Menyanthidis. At sugar, and resting upon walls, palings, &c.
Acronycta Ligustri. Carlisle.
Anarta cordigera. At rest on granite rocks on the moors, but very difficult to capture during sunshine. Rannoch.

Anarta melanopa, Thunb., *vidua*, Hub. Flying over club-moss in the sunshine, at an elevation of 3000 feet on rocky mountains. Rannoch.

Psodos trepidaria. July 2, on Scheallion, nearly at the top on the north side, flying in the sunshine.

Speranza sylvaria. July 14, flying among fern in the Black Forest, Rannoch, during sunshine.

Charissa obfuscaria. Isle of Arran, July 20, at rest upon stones.

Plusia interrogationis. Isle of Arran, flying in the sun among burnt heath: they invariably rest upon the burnt twigs of the heath with the head downwards: they are difficult to capture, from the rapidity of their flight.

Polyphasia russaria, var. *concinata*? Steph. This appears to be a permanent variety in Arran.

Emmelesia blandiata. June 10 to 30, among bushes, Rannoch.

Emmelesia ericetata. July 26, on stone walls and heath, near Carlisle.

Cosmia fulvago. August 9, Barron Wood, near Carlisle.

Orthosia neglecta. August 9.

Sarothripus undulanus. Beaten out of an oak, Barron Wood.

Orthosia congener. Barron Wood.

Stilbia anomalata. Three by beating, one at sugar.

Cleora teneraria. July 26 to August 24, by beating the oaks.

Graphiphora depuncta. August 9, Barron Wood.

Graphiphora Dahlii. Barron Wood.

Ceropacha diluta. August 14.

Triphæna fimbria. August 14.

Simæthis pariana. By sweeping the heath.

Apatela Leporina. On sugar, Carlisle.

Thyatira batis. August 14.

Venusia cambrica. Barron Wood, July 25.

Erastria uncana. Orton Moss, near Carlisle.

Polia Herbida and *nebulosa*. At sugar.

Harpalyce subtristata. Variety.

Scopula alpinalis. July 2, on Scheallion; July 15, on Ben Lawers.

Crambus radiellus, Curt. July 15.

Aplocera cæsiata, var. Black Forest, Rannoch.

Acidalia fumata. Black Forest.

Hadena glauca, *H. adusta*, *H. contigua* and *Mamestra Pisi*, var. On sugar, at Rannoch, in June.

Agrotis vallisera, *cursoria* and *Tritici*. Banks of Solway Frith.

Cerigo texta. Carlisle.

Ellopiæ fasciaria. Black Forest and Newby Cross, Carlisle.

Macaria lituraria. Black Forest.

Tethea subtusa. August, poplars.—James B. Hodgkinson; Harraby, Carlisle, September, 1847.

Capture of *Lepidoptera* new to Britain.

Eupisteria picearia. This species, which is new to Britain, was taken by Mr. Hodgkinson in Perthshire. It is the *Geometra picearia* of Hubner, but is probably the *G. carbonaria* of Linnè, described in the 'Fauna Suecica,' and figured by Clerck.

The *Boletobia carbonaria* of Boisduval, &c., appears to be the *fuliginaria* of Linnè, and of course the Linnean names ought to be restored.

Coccyx Cosmophorana, Tr. Mr. Hodgkinson captured this pretty species, and also another Tortrix, which appears to be *Stigmonota dorsana*, Hub., both of which are new to Britain. *Dorsana* of English authors is *Stigmonota internana*, Guen.

Scandia Picarella. This pretty Tinea was also taken by Mr. Hodgkinson. My friend Mr. Stephens kindly examined these three species, and it is upon his authority that I give the above names, which I believe to be correct.—*Henry Doubleday; Ep-ping, September 3, 1847.*

Occurrence of Colias Edusa near York.—*Colias Edusa* has made its appearance this year in the neighbourhood of York. I took a few specimens last week. Three specimens were first seen on the 31st of July, between which date and the 21st of the present month thirty-seven males and ten females have been taken in Heslington Field (the same locality in which we took *C. Hyale* in 1842). Some were taken resting upon the wild succory, scabious and knapweed, but the greatest part were captured flying. Thirteen years has elapsed since this beautiful species has been taken in the neighbourhood of this city, not having been observed since 1833 and 1834, during which years we took a few specimens; also in the above-mentioned locality.—*Robert Cook; 30, Colliergate, York, August 27, 1847.*

Occurrence of Colias Edusa at Godalming.—At a recent meeting of the Surrey Natural-History Society, Mr. Salmon, of Godalming, exhibited a pair, male and female, of this butterfly, captured by himself in the Godalming common meadows, on the 2nd of August.

Occurrence of Colias Edusa at Leominster.—I have just seen a fine male specimen of *Colias Edusa* flying about the Friends' burial-ground at Leominster. I believe it has never before been seen in this locality; and only one instance, as far as I am aware, has occurred of its appearance in the county of Hereford.—*Edward Newman; Leominster, August 17, 1847.*

Note on Melitæa Dia.—I have received, from Mr. Weaver and others, communications concerning this butterfly: all of them, like those already published, appear to me inconclusive. If this insect is really British, I cannot doubt it will again occur, and if so the matter will be settled to the satisfaction of all parties: at present the evidence, as furnished by Mr. Weaver himself, appears to me unsatisfactory; and I agree with those entomologists who decline to introduce the name into the British list.—*Id., August 19, 1847.*

Larva of Sphinx Convolvuli.—On the 25th of August I had two large caterpillars brought me, and on the 27th two more. The first of these was of an uniform dark green, with a row of black spots above the legs, and a transverse black line running a little beyond the middle; the horn red, base and tip black; head black, streaked with dark yellow. The others black, with an undulating white line above the legs, then a row of black spots; parallel to these, and near the top, another row of yellowish spots, a faint transverse line passed across each segment; the head as in the first, but the yellow streaks brighter; the horn black. In one of these specimens, which soon buried, the black wore a sickly hue, and was much paler, while the white ran up into the sides. These are the larvæ of *Sphinx Convolvuli*.* I cannot but think myself

* That your readers may not suppose I am mistaken, I will quote Mr. H. Doubleday's words, "Your larvæ are undoubtedly *Convolvuli*."

fortunate in obtaining the green caterpillar, as it shows this variety at least to have been known to the old collectors, and that they are entitled to a little more respect than they have lately received from us.—*John Sircom, Jun.; Brislington, September 2, 1847.*

Larva of Deilephila Celerio.—In the ninth month (September) of 1846 I was fortunate enough to meet with a caterpillar of *Deilephila Celerio*, which changed to a chrysalis in about a week after I had received it. As it would in due course have changed to the perfect insect during the fifth month (May) following, I was fearful of disturbing it previous to that time, it being so great a rarity. At the end of the month I examined the chrysalis, and found the shell to be extremely brittle. The moth was pretty well developed, and sufficiently flexible to admit of my spreading it out. I am rather inclined to believe it would have arrived at a perfect state, if I had placed it in a greenhouse, at the beginning of the month. Subsequently to my meeting with the caterpillar, I made a diligent search on various vines without finding any more, but had two more chrysalides brought me, both of which died.—*Edwin R. Ransome; Chelmsford, 11th of 6th mo., 1847.*

Note on Lasiocampa Trifolii.—In June last I captured seven larvæ of *Lasiocampa Trifolii*, on the cliffs, in the same situation I found it in the two preceding seasons. The whole of my larvæ changed, and on the 18th ult. I bred a fine female, which I put into a box, and took down to the coast, and captured six males attracted by the female. I tried this experiment the two last seasons, but failed, owing to my ignorance of its period of flight. I thought it flew by day, like *Lasiocampa Quercus*, but I discovered this season that about half an hour after sun-set it began to fly, and continued on the wing for about an hour. I subsequently took five more males, some of them much wasted: six of my bred ones have come out, and I have one more to come out.—*Wm. Noye; St. Just, in Penwith, September 7, 1847.*

Capture of Trachæa Atriplicis at Sugar.—On the evening of July 9th I took at sugar, near Brandon, in Suffolk, a splendid specimen of *Trachæa Atriplicis*: this is the third *truly British* specimen that has been captured. The composition was also visited by a single example of *Tethea octogesima*. During my stay I netted several *Agrophila sulphuralis*.—*J. W. Dunning; Elmwood Lodge, Leeds, August 23, 1847.*

Occurrence of Graphiphora depuncta near Carlisle.—I was fortunate enough to meet with this rare species, in fine condition, on the 9th of August, and my father and brothers have taken it since. I understand it has been taken in three other localities in England. The first specimen which was captured in this country occurred in the same locality in which ours were taken. It was sent to Mr. Westwood to figure.—*James B. Hodgkinson; Harraby, Carlisle, September, 1847.*

Capture of Epione advenaria at Battel.—I took seventeen very fine specimens of this insect here, by beating, between the 25th of May and the 7th of June. Had I known its value, I dare say I might have taken a hundred, as it was very common.—*James B. Ellman; Battel, September 3, 1847.*

Metamorphoses of Tetanocera ferruginea.—M. L. Dufour, to whom the Academy is already indebted for many interesting entomological investigations, thus explains the singular history of the metamorphoses of *Tetanocera ferruginea*. A fly, whose delicate wings and down would be injured by the contact of the least moisture, is destined to pass the first and second stages of its life in the water. The aquatic existence of the larvæ of Diptera is by no means a newly-ascertained fact in their history; for both Swammerdam and Réaumur have apprised us that those of *Stratiomys* live in

that medium. But do we know anything of the metamorphoses of those Muscidae acalypterae, with their solemn progress and silent flight, whose populous tribes frequent the plants of our ponds? No; and of the thousands of species named in the works of Dipterologists, scarcely one has been surprised in the mutations of its threefold life. M. Dufour has traced the history of a fact of this nature. He says:—

Towards the end of autumn, in 1846, I discovered a larva among the Lemna and Callitriche growing in the water of a marsh near Saint-Sever. It was far from being microscopical in point of size, since it was from fifteen to twenty millimetres in length. After having carefully observed the circumstances in which it occurred, I conveyed it to my study, where I observed the same conditions as nearly as possible; and I had the lively satisfaction of seeing the larva go on well, become changed into a chrysalis, and, in spite of the rigour of the long winter, the winged insect was developed in the following spring.

This larva is of a grayish colour and finely shagreened, and, like the leech, undergoes considerable variation in form and apparent structure, in consequence of the extreme contractility of its skin. Sometimes it is contracted and shrivelled up, and then presents a corrugated appearance, and a somewhat oval figure; at other times it is greatly extended, and then becomes lengthened out, attenuated in front and plane beneath, and rather convex above. It possesses but eleven segments; three cephalic, three thoracic, and five abdominal. The cephalic segments are tubular, retractile, and capable of being drawn one within the other like the tubes of a telescope; they are without asperities, and much smaller than the succeeding segments, within which they can entirely withdraw themselves. These modifications of form entail special physiological attributes, to understand which it is necessary to study the habits of the living larva. These three segments, endowed with an exquisite degree of sensibility and contractility, combine, according to my views, all the functions of the senses of other animals, such as feeling, sight, taste, smell, and instinct or intelligence, although they possess none of the special organs of the senses. The three cephalic represent the head and the bi-articulate proboscis of the future fly. Those of the thorax correspond to the three combined compartments of the perfect insect. In short, and I say it with a feeling of admiration for the organic conformity, the abdomen of the fly produced from this same larva, whose evolution has produced for me so much mingled solicitude and satisfaction, has no more than five segments. The larvæ of nearly all the Muscidae have two pairs of stigmata; in this, however, there is but a single posterior pair; and these afford a proof of the care taken by nature to ensure the due performance of the important function of respiration in an animal of aquatic habits unprovided with branchiæ. These pneumatic orifices are situated at the bottom of a stigmatic hollow, placed on the last segment of the body, which segment is eminently mobile. This hollow is crowned by eight large triangular lobes, all of equal size. These, in the act of respiration, remain emerged, and open like a regular corolla with eight petals; but when the larva has occasion to descend, it brings together the lobes of the hollow; and the edges of these lobes are so well adapted to each other, that they hermetically close the stigmatic receptacle. The orifices are in orbicular projections, into which the air is admitted by means of a median aperture; and when the integument of the larva becomes thinner as it elongates, a close inspection with a lens will show both the two principal tracheæ which terminate in the openings, and the anterior point where they anastomose and form a common canal.

A few days after I had replaced in the water the larva which I had been studying

and delineating, what was my surprise when I perceived a black body floating upon the surface of the liquid; this upon attentive examination proved to be a pupa. If I had not felt certain of having rigorously isolated my larva, I could not have believed that this pupa had any connexion with it, so little did it resemble the previous stage. The curious chrysalis, so unexpectedly presented, balanced itself like a boat at the least breath of air; and in meditating upon its mission, I felt myself more than ever humiliated before the astonishing conservative provisions of Nature. There, where the uneducated eye would have seen nothing but an inert fragment of wood blackened by putrefaction, I perceived the hermetically sealed cradle of a tender nymph, swathed and motionless, the future hope of the Tetanocera. I felt that this precious foetal receptacle was destined, by the Supreme Intelligence, to brave the storm during five months of the most inclement season; to become the sport of the waves; to preserve its vitality in defiance of the ice which would imprison it for days, and perhaps weeks; and at length, on the exclusion of the winged insect in the coming spring, to proclaim aloud the intelligent solitudes of Providence. This chrysalis had need to be formed of a tissue at once impermeable, resisting and elastic, in order to shield its frail inhabitant from direct contact with the water, and to break the force of its buffetings and inevitable shocks; it had also need of a form which should prevent it from being submerged at any time, and thus exposing, in the midst of so many dangers, so many elements of destruction, that precious deposit of a life then simply lethargic. This, surely, if I do not deceive myself, is the true philosophy of science.—*Report of the Meeting of the Académie des Sciences, on the 14th June, 1847, in the 'Nouvelle Revue Encyclopédique' for that month.*

Revision of British Hydrocantharidæ. By H. SCHAUUM, M.D., Sec. Ent. Soc. of Stettin, &c., &c.

HAVING paid for some time past much attention to the group of Hydrocantharidæ, and having compared typical specimens of nearly all the European species described within the last fifteen years by continental authors, I took advantage of a short stay in London to examine the species contained in the principal English collections, in order to reduce to one standard, where practicable, the different names used by British and continental entomologists.

It will be seen, by the following pages, that this difference of nomenclature is very great. It is, however, easily to be accounted for. The insular position of Great Britain must naturally tempt the collectors of that country to confine themselves entirely to the study of the productions of their own soil, of which they could hope eventually to obtain an almost complete knowledge; and they have succeeded so well in collecting these productions, that perhaps, with the exception of Sweden and Norway only, the entomological fauna of Great Britain is at present better known than that of any other country in Europe. This exclusive interest for British insects, has, however, militated against that exchange of specimens with foreign entomologists which is so necessary for the exact determination of species in all the more difficult genera and groups. British entomologists were compelled to determine their insects entirely according to the descriptions of continental writers; and it will be freely admitted

by everybody who has endeavoured to do this, that, at least in the more numerous and obscure genera, mistakes cannot be entirely avoided, where we are not guided by authenticated specimens of one or several species. So it frequently happened that British entomologists mistook the species of continental authors, and in consequence sometimes described the very species they had mistaken under a new name. On the other hand, modern German and French entomologists have proposed many species as new, which were previously published by British authors. The only fact which they can allege in order to excuse themselves, is, that having generally a much greater number of species before them, they could not positively decide to which of their species the descriptions of English writers were applicable.

It results, from the following list, that not a single species of the Hydrocantharidæ is exclusively British; they all occur also either in France, Switzerland and Germany, or in Norway and Sweden. The species common to Great Britain and Norway, and not found in Germany and France, are only two, viz., *Agabus arcticus* and *Hydroporus novem-lineatus*. The result which I obtained from the examination of another and much larger family of beetles, in British collections, is nearly the same. Amongst the British Carabidæ there are scarcely half-a-dozen species not yet discovered on the Continent, the more remarkable of which are *Leistus montanus*, *Blemus pallidus*, and *Lymnæum nigro-piceum*. This fact, that the number of exclusively British insects is exceedingly small, seems sometimes not to have been borne in mind even by entomologists of the present day, who supposed that insects new to the British fauna were also new to science. For instance, I am much inclined to believe that the *Aphodius ericetorum*, lately described by Mr. Hardy, is only the *A. lapponum* of Gyllenhal; and *Rhyzophagus cærulescens*, of the same author, the *R. cæruleus* of Wal. and Erichson; though I do not venture to give a positive opinion as to these species, not having compared specimens of them with the foreign ones above named.

I have not entered into any details of description in the following enumeration, all the species being sufficiently characterized in the works to which I have referred.

I cannot conclude these introductory remarks without acknowledging the great assistance I have received from Mr. Stephens, who has most kindly and liberally allowed me the free use of his extensive collection, by which means I have been able to decide with certainty concerning species which, had I obtained only access to descriptions, I could not satisfactorily have done. To Mr. Haliday, Mr. Wollaston and Mr. Hislop, I also beg to return my thanks, as well as to Mr. White and Mr. E. Doubleday, of the British Museum, from whom I have received every kindness and assistance.

GENUS HALIPLUS, Latr., Erichs., Aubé.

1. *H. elevatus*, Panz., Gyll., Steph., Aubé, Erichs.
2. *H. mucronatus*, Steph.
 - parallelus, Babington.
 - badius, Aubé.
3. *H. fulvus*, Fabr., Clairv., Babington, Erichs., Steph. Man.
 - ferrugineus, Gyll., Aubé.
 - ferrugineus, var., Steph. Ill.
4. *H. flavicollis*, Sturm, Aubé.
 - impressus, Erichs., Steph. Ill.
 - ferrugineus, Steph., Babington, not Linn.

The distinguishing characters of the last three species, which are nearly allied, are

sufficiently pointed out by Mr. Babington and Dr. Aubé. I think it right to retain for the last species the name under which Sturm has described and figured it. The collection of Fabricius shows that this author confounded, under the name of *Dyticus impressus*, this and several of the following species. *D. ferrugineus* of Linné does not belong to this insect, but is, according to his cabinet, the female of *Hyphidrus ovatus*.

5. *H. variegatus*, Sturm, Erichs., Aubé.
 - *subnubilus*, Babington.
 - *marginatus*, Steph. Ill., not Panz.
 - *ruficollis*, Steph. Man., not Degeer, Erichs.
6. *H. ruficollis*, Degeer, Erichs., Steph. Ill.
 - *impressus*, Gyll., Aubé.
 - *marginatus*, Panz.
 - *fulvicollis*, Steph. Man.
 - *melanocephalus*, Steph. Ill.
 - *brevis*, Steph.
 - *rubicundus*, Babington.

I have referred the *H. rubicundus* of Babington to this species, according to a specimen named by the author himself, existing in the collection of Mr. T. V. Wollaston, of Cambridge.

7. *H. cinereus*, Aubé, Erichs., Schiödt.

— *affinis*, Steph.

8. *H. fluvialilis*, Aubé, Erichs., Schiödt.

Of this species I have seen two British specimens only, in the collection of Mr. Wollaston.

9. *H. obliquus*, Fabr., Gyll., Steph., Aubé, &c.
10. *H. confinis*, Steph.
 - *lineatus*, Aubé, Erichs.
11. *H. lineatocollis*, Marsh., Gyll., Steph., Aubé, Erichs.
 - *bistriolatus*, Duftschm.

Genus CNEMIDOTUS, Illiger, Erichs., Aubé.

1. *C. cæsus*, Duftschm., Gyll., Steph., Aubé, Erichs.
 - *impressus*, Panz.

Genus PÆLOBIUS, Schönherr.

1. *P. Hermannii*, Fabr., Oliv., Steph., Erichs., Aubé, &c.

Genus HYPHIDRUS, Illiger.

1. *H. ovatus*, Linn. (Mus. Banks.) ♂, Steph., Erichs., Aubé.
Dy. ferrugineus, Linn. (Mus. Linn.) ♀, Donovan.
H. ovalis, Fabr., Gyll., ♂.
 — *gibbus*, Fabr., Gyll., ♀.
 Var. *H. variegatus*, Steph.

The *H. variegatus*, Steph. is a pale variety only of *H. ovatus*: it is totally distinct from *H. variegatus*, Ill., Aubé.

Genus HYDROPORUS, Clairville.

1. *H. inæqualis*, Fabr., Gyll., Steph., Erichs., Aubé, &c.

Dy. parvulus, Fabr.

— *trifidus*, Marsh.

Hygrotus reticulatus, Steph., not Fabr., &c.

2. *H. reticulatus*, Fabr., Gyll., Erichs., Aubé, &c.

Hygrotus collaris, Panz., Steph.

Var. Hy. affinis, Steph. Ill.

3. *H. decoratus*, Gyll., Sturm., Erichs., Aubé.

Hygrotus decoratus, Curtis, Steph.

4. *H. pictus*, Fabr., Gyll., Steph., Aubé, &c.

— *arcuatus*, Fabr., Panz.

5. *H. lepidus*, Oliv., Schönh., Aubé.

Hygrotus scitulus, Steph.

6. *H. confluentis*, Fabr., Panz., Gyll., Steph., Aubé.

7. *H. rivalis*, Gyll., Aubé.

Hygrotus fluviatilis, Steph.

Hy. Stephensii, Rudd, Steph.

I am not perfectly satisfied that this species is really different from the following. The only distinguishing character is the maculation of the elytra; and from the isolated or more or less confluent black lines of the *H. Sanmarkii*, there appears to exist every link to the irregular black patches of *H. rivalis*.

8. *H. Sanmarkii*, Sahlb.

— *assimilis*, Gyll., Aubé, Steph., not Payk.

9. *H. septentrionalis*, Gyll., Aubé.

— *alpinus*, Kunze, Steph., not Payk., Gyll.

— *fluviatilis*, Sturm.

The true *H. alpinus*, Payk., Gyll., of which *H. bidentatus*, Gyll., Aubé, is the female, and *H. borealis*, Gyll., a variety, has hitherto not been found in Great Britain.

10. *H. Davisii*, Curtis, Steph., Aubé.

— *borealis*, Steph., Aubé, not Gyll.

— *alpinus*, Duftschm.

— *septentrionalis*, Heer.

11. *H. assimilis*, Payk., Sturm.

— *frater*, Kunze, Steph., Aubé.

— *halensis*, Steph. Man., not Fabr., Erichs., Aubé.

— *areolatus*, Steph. Ill.

— *affinis*, Sturm.

12. *H. halensis*, Fabr., Germ., Erichs., Aubé.

— *areolatus*, Duftschm.

— *griseo-striatus*, Steph., not Degeer, Gyll., Aubé.

Of this species I have seen one British specimen only, existing in Mr. Stephens's collection.

13. *H. elegans*, Illig., Panz., Sturm.

— *brevis*, Sturm.

— *depressus*, Steph., Aubé.

The *H. depressus*, Fabr., Gyll., Sturm, found in Sweden, is dark beneath, and of a more elongated shape; and it is not ascertained that it is a mere local variety.

14. *H. duodecim-pustulatus*, Fabr., Steph., Aubé.

15. *H. parallelogrammus*, Ahrens, Sturm, ♂, Aubé, ♀, Erichs., ♂ ♀.

— *lineatus*, Marsh, ♀, Steph., ♂ ♀.

— *consobrinus*, Kunze, Aubé, ♂.

— *nigro-lineatus*, Kunze, Sturm, ♀.

16. *H. novem-lineatus*, Rudd, Steph. Ill., ♀.

— *nigro-lineatus*, Gyll., Steph., ♀, not Steven, Aubé.

— *consobrinus*, Zetterst., ♂.

— *Schönherri*, Aubé, ♂.

— *parallelus*, Aubé, ♀, var.

This insect is not the true *H. nigro-lineatus* described by Steven in Schönherr Synon. Ins., which is identical with *H. enneagrammus* of Sturm. I have retained for the above species the very significant name of *H. novem-lineatus*, under which it is described by Mr. Rudd in Stephens's Illustrations, vol. ii. p. 192. It is very scarce and local, and Mr. Stephens has only the female. A fine series of both sexes has been taken by Mr. Haliday, at a little lake in the Isle of Bute.

17. *H. picipes*, Fabr., Gyll., Steph., Aubé, &c.

♀ var. *H. alternans*, Kunze, Steph. Ill.

H. lineellus, Gyll.

18. *H. dorsalis*, Fabr., Gyll., Steph., Aubé, &c.

Var. *H. figuratus*, Gyll.

19. *H. opatrinus*, Germ., Steph., Aubé.

20. *H. latus*, Steph., Curtis fol.

— *ovatus*, Sturm, Erichs., Aubé.

— *castaneus*, Heer.

21. *H. palustris*, Linn., Sturm, Steph., Erichs.

— *sexpustulatus*, Fabr., Gyll., Aubé.

Dy. *lituratus*, Fabr., Panz.

H. proximus, Steph. Ill.

Var. *H. cambriensis*, Steph., Curtis fol.

The original specimen of Dy. *lituratus*, Fabr., which I have seen in Fabricius's own collection at Kiel, belongs to this species, and not to *H. lituratus*, Aubé.

22. *H. vittula*, Erichs.

— *ambiguus*, Aubé.

— *nigrita*, Steph., not Fabr., Gyll., Aubé.

By comparison of original specimens, I have ascertained that *H. vittula*, Erichs., and *ambiguus*, Aubé, are identical. *H. striola*, Gyll., to which *H. vittula* had been referred by Dr. Aubé, is a distinct species.

23. *H. xanthopus*, Steph.

— *planus*, Steph. Man., not Fabr., &c.

— *flavipes*, Steph. Ill., not Fabr.

— *lituratus*, Brullé, Aubé.

This species being neither *D. planus*, Fabr. (v. No. 25), nor *D. flavipes* (v. No. 28), nor *D. lituratus*, Fabr. (v. No. 21), the name of *H. xanthopus* is to be retained for it.

24. *H. pubescens*, Gyll., Aubé.
 — *melanocephalus*, Marsh., Steph., Sturm.
 — *caliginosus*, Steph. Man.
 — *planus*, Marsh., Steph. Ill.

I retain for this species the name of *H. pubescens*, although subsequent to *melanocephalus*, Marsh., in order to avoid confusion with *H. melanocephalus*, Gyll., Aubé, a very distinct species, which has not yet received any other name.

25. *H. planus*, Fabr., Gyll., Sturm, Erichs., Aubé.
 — *flavipes*, Fabr.
 — *ater*, Forster, Steph.
 — *holosericeus*, Marsh., Steph. Ill.
 — *pubescens*, Steph., not Gyll., Aubé.
 — *fuscatus*, Steph.
 26. *H. erythrocephalus*, Linné, Fabr., Gyll., Steph., Aubé, &c.
 ♀ var. *H. deplanatus*, Gyll., Aubé.
 27. *H. rufifrons*, Duftschm., Gyll., Sturm, Aubé, Erichs.
 — *piceus*, Steph.
 28. *H. oblongus*, Steph.
 — *nitidus*, Sturm, Erichs., Aubé.
 29. *H. ferrugineus*, Steph.
 — *victor*, Aubé.
 30. *H. memnonius*, Nicolai, Erichs., Aubé, Steph. Man.
 — *subelongatus*, Steph., ♂.
 — *marginatus*, Steph., ♂ immature, not Duftschm., Kunze, Aubé.
 — *deplanatus*, Steph., ♀, not Gyll., Aubé.
 — *niger*, Sturm, ♂.
 — *jugularis*, Babington, ♂ ♀.
 — *castaneus*, Aubé, ♀.
 31. *H. Gyllenhalii*, Schiödte.
 — *rufifrons*, Steph., not Duftschm.
 — *piceus*, Aubé, not Steph.,* not Sturm, Erichs.†
 32. *H. tristis*, Payk., Gyll., Sturm, Erichs., Aubé.

I have seen two British specimens of this species in Mr. Wollaston's collection ; it was unknown to Mr. Stephens.

33. *H. angustatus*, Sturm, Erichs., Aubé.
 — *tristis*, Steph., not Payk., &c.
 — *acuminatus*, Sturm.
 34. *H. obscurus*, Sturm, Erichs., Aubé.
 — *tristis*, var. β . Gyll.
 — *umbrosus* ? Steph.

This species has been taken plentifully in Ireland by Mr. Wollaston. The typical specimen of *H. umbrosus*, Steph., is very old, and not in good preservation ; it is therefore only with doubt that I refer it to this species.

* No. 27.

† Is most probably a variety of No. 24.

35. *H. umbrosus*, Gyll., Sturm, Aubé, Erichs.

— *minutus*, Steph.

36. *H. Scalesianus*, Steph.

— *pygmæus*, Sturm, Aubé, Erichs.

Of this pretty minute species I have seen one British specimen only, in Mr. Stephens's cabinet. It has been taken in great abundance at Berlin, but is very local.

37. *H. lineatus*, Fabr. ? Oliv., Gyll., Sturm, Aubé, Erichs.

— *ovatus*, Fabr.

— *pygmæus*, Fabr., Steph.

— *ovalis*, Marsh., Steph.

The two specimens of *D. lineatus* in Fabricius's own collection belong to *H. alpinus*, Payk. ; it is however very doubtful if they are those which he described.

38. *H. flavipes*, Oliv., Aubé.

— *minimus*, Steph., not Scop.

— *concinus*, Steph.

— *marmoratus* ? Bakewell, Steph.

I have not seen any specimen of the *H. marmoratus*, described by Mr. Bakewell in Stephens's Illustrations : it does not exist in Mr. Stephens's cabinet ; but the description agreeing with a variety of *H. flavipes*, in which the yellow longitudinal lines of the elytra next to the base are abbreviated, I have referred it with doubt to this species.

39. *H. granularis*, Fabr., Gyll., Steph., Sturm, Erichs., Aubé.

40. *H. geminus*, Fabr., Gyll., Steph., Aubé, Erichs.

— *pusillus*, Fabr.

41. *H. unistriatus*, Illig., Oliv., Steph., Erichs., Aubé.

— *parvulus*, Payk., Gyll.

Hygrotus bisulcatus, Curtis, Ann. Nat. Hist.

42. *H. minutissimus*, Germ., Aubé.

— *trifasciatus*, Wollaston.

Genus NOTERUS, Clairville.

1. *N. crassicornis*, Fabr., Gyll., Steph., Erichs., Aubé.

— *capricornis*, Herbst, Sturm.

2. *N. semipunctatus*, Fabr., Erichs., Steph. Man.

— *sparsus*, Marsh., Curt., Steph. Ill., Aubé.

Genus LACCOPHILUS, Leach.

1. *L. minutus*, Linn. (Mus. Linn.), Fabr., Erichs., Steph. Man.

— *interruptus*, Panz., Aubé.

— *hyalinus*, Marsh., Steph.

2. *L. hyalinus*, Degeer, Erichs., Steph. Man.

— *minutus*, Marsh., Steph. Ill., Aubé.

— *obscurus*, Panz.

Genus AGABUS, Leach, Erichs.

1. *A. agilis*, Fabr., Erichs., Steph. Man.

— *oblongus*, Ill., Gyll., Steph. Ill., Aubé.

Dy. hæmorrhoidalis, Fabr., var.

— *ruficollis*, Schaller.

2. *A. arcticus*, Payk., Gyll., Steph.
3. *A. guttatus*, Payk., Gyll., Steph., Aubé.
4. *A. fontinalis*, Steph. Ill.
— *guttatus*, var., Steph. Man.
— *vittiger*, Steph., not Gyll., Aubé.

This species is distinguished from the preceding by its more elongated shape, and especially by the upper claw of the anterior feet of the male, which has at its base a strong tooth, while it is simple in *H. guttatus*. Perhaps this species is the *A. biguttatus*, Oliv., Aubé, but not finding that striking character mentioned in Aubé's description, and not being able to compare at present a foreign specimen, I must leave this question undecided.

5. *A. chalconotus*, Panz., Ill., Gyll., Steph., Aubé, &c.
— *cyaneus*, Steph. Ill., var.
— *montanus*, Steph.
— *nigro-æneus*, Marsh., Steph., not Erichs.
— *aterrimus*, Steph.

This species varies both in size and colour. The *A. montanus*, Steph., seems to me to be only a small variety; the *A. nigro-æneus* are immature specimens, and distinct from the species described under the same name by Erichson.

6. *A. affinis*, Payk., Gyll., Steph., Sturm, Erichs., Aubé.
Col. *branchiatus*, Babington, Steph.

All the specimens which I have seen in different collections under the name of Col. *branchiatus*, Babington, belong to this species.

7. *A. paludosus*, Fabr., Gyll., Steph., &c.
— *striolatus*, Steph., not Gyll.

The *A. striolatus*, Steph., is an abnormal specimen of this species, and distinct from *A. striolatus*, Gyll., Aubé.

8. *A. congener*, Payk., Gyll., Steph., Erichs., Aubé.
— *confinis*, Steph., not Gyll.
9. *A. femoralis*, Payk., Gyll., Steph., Sturm, Erichs., Aubé.
— *assimilis*, Sturm, Aubé.
10. *A. uliginosus*, Payk., Gyll., Sturm, Erichs., Aubé.
11. *A. abbreviatus*, Fabr., Gyll., Steph., Aubé, &c.
12. *A. maculatus*, Linn., Fabr., Steph., Aubé, &c.
13. *A. vitreus*, Payk.
— *didymus*, Oliv., Aubé.
14. *A. bipunctatus*, Fabr., Gyll., Aubé, &c.
— *nebulosus*, Forst., Steph.
15. *A. conspersus*, Marsh., Steph., Hornung.
— *subnebulosus*, Steph., Aubé.
16. *A. brunneus*, Fabr., Aubé, Steph. Man.
Dy. *castaneus*, Sch.
Co. *ferrugineus*, Steph. Ill.
17. *A. Sturmii*, Schönh., Gyll., Steph., Aubé, &c.
18. *A. bipustulatus*, Linn., Fabr., Steph., Aubé, &c.
— *carbonarius*, Fabr., Gyll., Sturm, &c.
Var. Co. *Snowdonius*, Newm., Steph. Ill.

The *Colymbetes consobrinus*, Curtis, the type of which exists in the collection of

the Zoological Society, has been erroneously given as a British insect ; it is a native of the Cape of Good Hope (v. Steph. Man.)

I have not ventured to introduce *A. serricornis*, Payk., into the above list of the genus *Agabus*, as I have not seen any specimen of it undoubtedly British.

Genus *ILYBIUS*, *Erichs.*

1. *I. ater*, Degeer, Fabr., Gyll., Steph., &c.

Ag. quadrinotatus? Steph.

Mr. Stephens has described his Ag. quadrinotatus from some unnamed specimens in the British Museum. The only specimens still existing in that collection, to which he can have alluded, belong decidedly to *I. ater* ; one of them is somewhat immature, and therefore not so black as the common specimens of *ater* ; the two red spots on the crown described by Mr. Stephens are very conspicuous. It appears that Mr. Stephens has attributed to them too small a size ($4\frac{1}{2}$ lines) ; they measure 6 lines.

2. *I. obscurus*.

Col. obscurus, Marsh., Steph.

Il. quadriguttatus. Lacord., Erichs., Aubé.

3. *I. fenestratus*, Fabr., Gyll., Steph., Aubé.

Ag. subæneus, Steph.

Dyt. lacustris, Fabr.

I am very much in doubt if the *I. subæneus*, Erichs., is a species really distinct from *fenestratus*.

4. *I. guttiger*, Gyll., Steph., Erichs., Aubé.

5. *I. angustior*, Gyll., Steph., Erichs., Aubé.

6. *I. uliginosus*, Linn. (Mus. Linn.)

— fuliginosus, Fabr., Gyll., Steph., Aubé.

Dyt. lacustris, Panz.

According to both the collection and description of Linné, this is the true Dyt. uliginosus of that author.

Genus *COLYMBETES*, *Clairville*.

1. *C. fuscus*, Linn. (Mus. Linn.), Fabr., Gyll., Sturm., Erichs., Steph.

— striatus, Aubé, Steph. Man.

— Paykulli, Steph. Man.

Neither the true *C. striatus*, Linn., Erichs. (Bogemanni, Gyll., Aubé), nor the *C. Paykulli*, Erichs. (*striatus*, Payk., Gyll.), have hitherto been found in Great Britain. All the specimens in Mr. Stephens's collection belong to the above species.

2. *C. pulverosus*, Steph., Sturm, Erichs.

— conspersus, Gyll., Aubé.

3. *C. notatus*, Fabr., Gyll., Steph., Aubé, &c.

4. *C. exoletus*, Forst., Steph.

— collaris, Payk., Gyll., Erichs., Aubé.

5. *C. bistriatus*, Bergstr., Erichs., Aubé, Steph. Man.

— agilis, Payk., Gyll., Steph. Ill., Aubé.

6. *C. adspersus*, Fabr., Gyll., Steph., Aubé, &c.

7. *C. Grapii*, Gyll., Steph., Erichs., Aubé.

— niger, Lacord.

Genus HYDATICUS, Leach.

1. *H. transversalis*, Fabr., Panz., Steph., &c.
2. *H. Hybneri*, Fabr., Oliv., Steph., &c.
3. *H. stagnalis*, Fabr., Gyll., Steph., &c.
4. *H. cinereus*, Payk., Gyll., Curt., Steph., &c.

In Linné's collection three different insects are confounded under the name of *Dy. cinereus*, viz., *H. zonatus*, Hoppe, *H. bilineatus*, Degeer, and the female of *Acilius sulcatus*.

Genus DYTISCUS, Linné.

1. *D. circumcinctus*, Ahrens, Gyll., Steph., Sturm, Aubé, Erichs.
 ♀ *var. elytris sulcatis*: *D. dubius*, Gyll., Aubé.
D. angustatus, Steph.
2. *D. marginalis*, Linné, &c.
 — *submarginalis*, Steph. Ill.
 ♀ *var. elytris lævibus*: *D. conformis*, Kunze, Steph., Aubé.
3. *D. circumflexus*, Fabr., &c.
 ♀ *var. elytris sulcatis*: *D. perplexus*, Aubé.

The three preceding species have two forms of females, one with smooth, the other with sulcated elytra. Of *D. circumcinctus* the smooth females are the commoner, the sulcated the rarer ones; of *D. marginalis* both forms are nearly equally common; of *D. circumflexus* the continental females are smooth, the sulcated, described by Dr. Aubé under the name of *D. perplexus*, being exceedingly scarce; the British females of this species which I have seen are, on the contrary, all sulcated. Some authors think that the smooth and sulcated females belong to different species; and the Rev. W. Kirby has even divided them into the genera *Leionotus* and *Dytiscus*, the former including the species with smooth, the latter those with sulcated elytra; but as the males are perfectly alike, and as the same discrepancy among the females has now been observed in four European species (the three above named and *D. lapponicus*), and as two forms of females occur also in some species of *Hydroporus* (*H. picipes*, *erythrocephalus* and *unistriatus*, one with shining, the other with an opaque and more finely punctured surface), I think the opinion of Erichson, which I have followed, may be considered as sufficiently established.

4. *D. punctulatus*, Fabr., &c.
5. *D. dimidiatus*, Bergstr., &c.

Genus CYBISTER, Curtis.

1. *C. Roeselii*, Fabr., &c.

Genus ACILIUS, Leach.

1. *A. sulcatus*, Linn., &c.
 — *scoticus*, Steph. Ill., *var.*
2. *A. fasciatus*, Degeer, Erichs., Steph. Man.
 — *canaliculatus*, Nicolai, Steph., Aubé.
 — *caliginosus*, Curtis.
 — *sulcipennis*, Sahlb.

Genus *GYRINUS*, Geoff.

1. *G. marinus*, Gyll., Ahr., Erichs., Aubé, Suffr.
 — *natator*, Fabr., not Linn.
 — *æneus*, Steph., var. *major*, not Aub.
 — *æratus*, Steph., var. *minor*.
 — *dorsalis*, Gyll., var.

The *G. æratus*, Steph., seems to be only a very small variety of *marinus*.

2. *G. natator*, Linn. (Mus. Linn.), Gyll., Steph., Aubé.
 — *mergus*, Ahrens, Erichs., Suffr.
 Var. *G. natator*, Ahrens, Suffr.
 — *substriatus*, Steph.
 — *cercurus*, Schiödt.

The *G. natator*, Ahrens, Suffr., *substriatus*, Steph., is a variety, in which the series of punctures on the elytra have nearly disappeared. There exists a regular gradation from these to the typical *natator*, Linn., *mergus*, Ahr.

3. *G. minutus*, Fabr., &c.
4. *G. bicolor*, Payk., Gyll., Curtis, Steph.
 — *angustatus*, Aubé, var.

The British specimens belong to the variety with the sternum and tip of the abdomen red: this has been described by Aubé under the name of *G. angustatus*; in the typical specimens these parts are black.

5. *G. urinator*, Illig., Aubé.
 — *lineatus*, Steph.

Genus *ORECTOCHILUS*, Eschscholtz.

1. *O. villosus*, Fabr., Gyll., Steph., Aubé.
 Gy. Modeeri, Marsh.

H. SCHAUUM.

September 16, 1847.

On the occurrence of Insects at the Salterns.—Whilst returning from Dorchester to London, on the 19th of June, I took the opportunity of remaining two days at Lynton, in Hampshire, for the purpose of examining the Salterns. The time was too short to admit of my gaining anything like an accurate knowledge of the insects which are found there; nevertheless a short notice of such species as *did* come beneath my observation may not be altogether unacceptable. It is singular that such a remarkable locality, in such an accessible neighbourhood, should be so little visited by entomologists; for I am perfectly convinced, from what I saw of its Coleoptera, that there are few districts in England, if any, which would more amply repay the labours of a thorough investigation. I here, for the first time in my life, took the very local and interesting *Berosus spinosus*, which, in the stagnant waters of the old brine-pits, may be met with in tolerable abundance. Under small stones, and on the mud of the excavations, which are half dry, that very beautiful little insect, *Notaphus ephippium*,

so much prized throughout Europe for its rarity, was in actual profusion; in company with which, the minute *Tachys scutellaris* and *Anthicus humilis* were scarcely less abundant. In the same localities, though more sparingly, I met with *Pogonus Burrelii*, *chalcus* and *littoralis*, which, together with *Notaphus ustulatus* and *Lopha pusilla*, might be seen running in and out of the crevices formed by the heat of the sun upon the mud; while a few drags of my sweeping-net brought to light *Oethebius marinus* and *hibernicus*, by hundreds, from the brackish waters of the surrounding pools. The Hemiptera were also tolerably abundant, particularly the large *Acanthia littoralis*, which made itself excessively conspicuous by bounding over the flats. The commoner insects I need scarcely mention; suffice it to observe that many of them, such as *Dyschirius gibbus*, *Adelosia picea*, and *Aphodius hæmorrhoidalis*, were exceedingly numerous: and I can only repeat what I before stated, that I know of no district in England on so small a scale which would be more likely to produce a greater number of novelties, or which would more amply repay the exertions of an entomological investigation.

—*T. Vernon Wollaston; Jesus College, Cambridge, August 1, 1847.*

Capture of Lymnæum areolatum in North Wales.—I have great pleasure in recording the capture of this very rare and interesting little insect, about a dozen specimens of which were taken by myself at Bettws-y-coed, in North Wales, during the last week in July. Its habits are precisely the same as those of its generic brother, *nigropiceum*, which Mr. Dawson has captured so abundantly in the Isle of Wight, and which I have myself taken, while in company with him, in the same locality. At the junction of the River Llugwy with the Conway there is a small shingly beach, sloping for about three feet, at an angle of 45°, to the edges of the stream. Whilst searching there for *Tachypus striatus* and some species of *Peryphi* (three of which—*atro-cæruleus*, *nigro-æneus* and *tibialis*—are excessively abundant), I was fortunate enough to secure a specimen of *Lymnæum areolatum*, basking under a stone. For a week I visited the same spot incessantly, and, though I searched most assiduously for hours together, I could procure in all only about a dozen specimens. They inhabit the moist shingle, and seldom come to the surface, except now and then during the heat of the day, when they may be seen occasionally just to expose themselves to view, and dart down again with the rapidity of lightning. Their minute size, added to the excessive quickness of their movements, renders it exceedingly difficult to secure them, even when seen,—for unless they are pounced upon immediately, in an instant they are gone, and are almost sure to be lost amongst the shingle. If I am not mistaken, the only recorded instance of its occurrence in this country was on Dudden Sands, near Broughton, in Lancashire, where it was captured many years ago by Mr. Dale, of Glanville's Wootton.—*Id., August 28, 1847.*

Extraordinary Quantity of Coccinellæ.—In walking out into a part of Romney Marsh, in the neighbourhood of this town, I was surprised to observe vast multitudes of an insect that we used familiarly to call lady-birds: they covered the ground more or less for the whole of my walk, climbing up everything that rose perpendicularly therefrom, being especially thick near and upon the wooden posts and rails used to fence off the property in the marsh. It was and had been blowing rather a stiff breeze from the east and north-east; and I noticed that these insects chose the side most sheltered from the wind, getting into and filling all chasms and cracks in the wood, and always especially numerous on the top of the posts, giving them the appearance of being studded with brass-headed nails. Imagine this for miles, and then some estimate may be formed of their countless multitudes. Perhaps some of the

contributors to the 'Zoologist' may be able to throw light on the extraordinary movements of these little insects.—*William Allen ; Rye, Sussex, 15th of 8th mo., 1847.*

Extraordinary Flight of Coccinellæ.—"Between four and six o'clock on Thursday evening, a long cloud, reaching some few miles across the sea, was observed by many hundred spectators from the heights of Ramsgate and Margate, bending its course to our southern coast, from the direction of Calais and Ostend, but which had more the appearance of a long column of smoke from a steamer on a calm day; but about ten o'clock in the evening the excitement was intensely increased by the remaining promenaders on the several promenades and cliffs of the above places being literally covered with lady-birds. Thus many of those persons who had been most exposed, on their return to their homes, found themselves not only enveloped with this compact little shell insect, but so regularly dotted on the clothes, that it had the appearance of a scale armour. At an early hour in the morning, the whole of the line of coast was found to be covered with them, to the great annoyance of all parties; and in order to give the reader a correct idea of the extent and quantity of these unwelcome settlers, five bushels were swept from the Margate Pier, and nearly the same from that of Ramsgate Harbour. To walk on them might be readily compared to walking on snow on a frosty day. The locality whence they first took flight remains at present unknown."

"Brighton was swarmed with lady-birds on Saturday and Sunday. They were crushed by thousands upon the pavement of the Grand Parade and the adjoining streets; whilst the houses, the fences, and even the clothes of all pedestrians were dotted over by the tawny strangers. Children were seen gathering them up for amusement literally in handfuls. A similar swarm visited Brighton about seven years ago, and a slighter visitation of the same kind was experienced three years since."

"A correspondent at Southend writes:—"On Friday the whole of the coast around Southend was visited by one of the most numerous flights of insects on record. They consisted of at least five species of lady-bird, and they came in such dense numbers, as for miles along the coast to resemble a swarm of bees during hiving. The sea destroyed countless millions of them; the grass and hedgerows, and every crevice that afforded shelter from the wind, were coloured with their numbers, and for many miles it was impossible to walk without crushing numbers beneath the tread. The insects evidently came from the east, the wind having veered round to that point during the night. Every true friend of agriculture, however, hails the appearance of these insects, as they are well known to be the destroyers of Aphides, a race of flies the most injurious to vegetation."—*Times.*

Migrations of Insects.—Lest by any chance it should have escaped your notice, I enclose an extract from the 'Times' of August 16th, 1847 [reprinted above], which gives a very interesting account of a huge swarm of lady-birds, which were actually seen coming in the direction of the French or Belgian coast some hours before they arrived on our shores. Migrations, in large bodies, of Aphides, flies, locusts, and other insects, are common, but this peculiarly well-observed and enormous emigration of *Coccinellæ* from the Continent is well worthy of note. The believers in Mr. Smee's theory of the cause of the potato disease may congratulate the country on this arrival of destroyers of the destroyer. The Aphides being a race endowed with such very migratory instincts, we are not surprised to find that their parasites are obliged to shift their quarters also. If it should appear that the hops in Kent are peculiarly infested with blight next year, how wonderful would this friendly arrival from a distant land

seem to be! Migratory flights of butterflies, and of various species, have often been observed. Swarms of white butterflies have been actually seen to arrive at Dover. Can we doubt that the *Sphinx Convolvuli*, as well as the locusts of last year, the *Colias Hyale* of two or three years before, the *Vanessa Antiopa* of some score of years since, and also the occasional specimens of *Antiopa*, of *Pontia Daplidice*, of *Argynnis Lathonia*, and perhaps even of *Papilio Podalirius*, are arrivals from the Continent? Might we not even extend this to *Colias Edusa*, and consider it a more regular immigrant? Nay the common *Cynthia Cardui* is a notoriously migratory butterfly, not even fearing to cross the snows of the highest Alps. Now, are these butterflies of periodical appearance on the Continent? I believe not. The *freshness* of the specimens is a common argument against their having come from a distance, and it seems a good one, though an insect perpetually in the air is less likely to be damaged than one blown about amongst leaves and flowers. I do not mean though that in every instance the specimens themselves have come from abroad; perhaps their parents were the original settlers. *Colias Hyale* decreased in numbers for two or three years before it disappeared: so of *Papilio Machaon*, of which I turned out great quantities in Nottinghamshire and Derbyshire: a few specimens were seen in two succeeding years, till under the pressure of unfavourable conditions of life they finally disappeared. The appearance of all these insects only, or most abundantly, on the east coast, whilst they gradually became rarer towards the west, is another strong point. Can I suppose that a single worn female of *Colias Hyale*, which I found on a Derbyshire hill the first year of their abundant appearance in England, was anything but an immigrant? But I have perhaps already said too much on this doubtful and mysterious subject, for there is much that might be alleged on the other side of the question, which it would be tedious to enter into, and unnecessary in the present imperfect state of our knowledge.—*J. Wolley, Jun.; Beeston, August 17, 1847.*

Occurrence of the Locust at Newcastle-on-Tyne.—A specimen of *Locusta migratoria* was taken on our town moor, and brought to me this evening.—*T. J. Bold; 42, Bigg Market, Newcastle-on-Tyne, August 24, 1847.*

Occurrence of the Locust near York.—I have just received a very fine specimen of the locust, captured near York on the 26th instant.—*Frederick Bond; Kingsbury, August 28, 1847.*

Occurrence of the Locust at Redcar.—Yesterday I picked up on the beach at this place twelve drowned locusts, and saw many others in the same state. Three were also captured on the sand-hills, and others seen very alert on the wing.—*T. S. Rudd; Redcar, August 20, 1847.*

Reappearance of the Locust.—A few specimens of the locust have occurred in the neighbourhood of London within the last few days, but both near London and in the provinces the number is decidedly less than last year. I hope communications on this subject will be transmitted as early as possible, in order that they may appear simultaneously in the November number. It is very desirable to keep a faithful record of these unusual visitations. The specific identity of our locust with the *Gryllus migratorius* of the Continent is not satisfactorily made out. Mr. Bracy Clark has obligingly handed me Egyptian specimens which are evidently distinct.—*Edward Newman.*

Otter breeding in the Gardens of the Zoological Society.—"The female otter was presented to the Society by Lady Rolle, on the 4th of February, 1840, being apparently at that time about three months old. She remained without a male till the 11th of March, 1846, when a large male was presented to the Society by the Rev. P. M. Brunwin, of Braintree, Essex, in whose possession it had been for some months, and had been kept in a cellar. His weight when first taken was 21 lbs., but he was not above half that weight when he arrived at the Gardens, having wasted much in confinement and become very weak in the loins, from which he soon recovered after his arrival. About a month after his arrival there was a continual chattering between him and the female during the night, which lasted for four or five nights; but they did not appear to be quarrelling. Nothing further was observed in their manners or in the appearance of the female to make me think she was with young, until the morning of the 13th of August, when the keeper that has the charge of them went to give them a fresh bed, which he does once a week: while in the act of pulling out the old bed he observed two young ones, apparently five or six days old, and about the size of a full-grown rat; he immediately put back the bed, with the young on it, and left them. On the 21st the mother removed them to the second sleeping-den, at the other end of their enclosure, and several times after she was observed to remove them from one end of the house to the other, by pushing them before her on a little straw; her object in removing them appeared to be to let them have a dry bed: on the 9th of September they were first seen out of the house; they did not go into the water, but crawled about, and appeared very feeble.

"On the 26th of September they were first seen to eat fish, and follow the mother into the water: they did not dive into the water like the mother, but went into it like a dog, with their head above water; and it was not until the middle of October that they were observed to plunge into the water like the old ones. On the 22nd of December the water was let out of the pond for the purpose of cleaning it, which is done once a week: the animals were shut up in their sleeping-den, but they let themselves out when the pond was but half-full of water, and the young ones got into it and were not able to get out without assistance: after they had been in the water some minutes the mother appeared very anxious to get them out, and made several attempts to reach them from the side of the pond where she was standing; but this she was not able to do, as they were not within her reach. After making several attempts in this manner without success, she plunged into the water to them, and began to play with one of them for a short time, and put her head close to its ears, as if she was making it understand what she meant; the next moment she made a spring out of the pond, with the young one holding on by the fur at the root of the tail with its teeth; having safely landed it, she got the other out in the same manner: this she did several times during a quarter of an hour, as the young ones kept going into the water as fast as she got them out. Sometimes the young held on by the fur at her sides, at others by that at the tail. As soon as there was sufficient water for her to reach them from the side of the pond, she took hold of them by the ears with her mouth and drew them out of the pond, and led them round the pond close to the fence, and kept chattering to them, as if she was telling them not to go into the pond again."—"Proceedings of the Zoological Society," No. CLXX., p. 27.

Extracts from Couch's 'Illustrations of Instinct.'

[This little book appears to me to have received an unfortunate title. I should describe it as a common-place book of Natural-History incidents, interspersed with certain moral, philosophical and theological observations, the connexion between which and the incidents is not very obvious. Besides excellent anecdotes and histories penned from the author's own observations, we have others by Rusticus, Waterton, Yarrell, &c. We hope Mr. Couch may be called on for a second edition, and that he will see the propriety of omitting much reasoning that is not to the point, arranging the sound matter zoologically or alphabetically, and leaving the words 'Instinct' and 'British' out of his title-page.—*Edward Newman.*]

Newfoundland Dog preying on Crabs.—"The modes employed by dogs of different races in capturing and devouring the crab, and especially that pugnacious species the velvet crab (*Portunus puber*), well illustrate the experience which has become propagated in the breed, over the ignorance of the uninitiated. On the first discovery of the prey, a terrier runs in to seize it, and is immediately and severely bitten in the nose. But a sedate Newfoundland dog of my acquaintance proceeds more soberly in his work. He lays his paw on it, to arrest it in its escape: then tumbling it over, he bares his teeth, and, seizing it with the mouth, throws the crab aloft: it falls upon the stones: the shell is cracked beyond redemption; and then the dainty dish is devoured at his leisure."—*p. 179.*

Anecdote of a Cat.—"There was, within my knowledge, in the house of my parentage, a small cupboard, in which were kept milk, butter, and other requisites for the tea table; and the door was confined with a lock, which, from age and frequent use, could be easily made to open. To save trouble, the key was always kept in the lock, in which it revolved on a very slight impulse. It was often a subject of remark that the door of this cupboard was found wide open, and the milk or butter greatly diminished, without any imaginable reason, and notwithstanding the persuasion that the door had certainly been regularly locked; but it was accident that led to the detection of the offender. On watching carefully, the cat was seen to seat herself on the table; and, by repeated patting on the side of the bow of the key, it was at last made to turn, when a slight pull on the door caused it to move on its hinges. It had proved a fortunate discovery for puss for a long time before she was taken in the fact."—*p. 196.*

Anecdote of a Cat and Weasel.—"It would be as easy to catch a weasel asleep as off its guard; but it seems still more unlikely that, in the disguise of death, it should suffer itself to be cuffed, and pawed, and handled with impunity by a cat: yet it so happened that, while puss was reclining at ease, seemingly inattentive to all the world around her, a weasel came unexpectedly up, was seized in a moment, and, dangling from her teeth as if dead, was thus carried to the house at no great distance. The door being shut, puss, deceived by its apparent lifelessness, laid her victim on the step, while she gave her usual mewling cry for admittance. But by this time the active little creature had recovered its recollection, and in a moment struck its teeth into its enemy's nose. It is probable that, besides the sudden surprise of the capture, the firm grasp which the cat had of it round the body had prevented any earlier effort at resistance from the weasel; for in this manner our smaller quadrupeds, which bite so fiercely, may be held without injury; but the weasel can hardly be supposed to have been practising a deception all the while it was in the cat's mouth."—*p. 203.*

Habits of the Mole.—"The habits of the mole will vary with the soil, and particularly with the structure of the ground, as it is rich and deep, or shallow, level, rocky, uneven, or intersected with raised mounds, or hedges of earth five or six feet high, and of the same thickness, such as divide fields in the West of England. The presence of this animal is known by the heaps of fine earth, or hills, thrown up during its subterranean operations: in deep ground little of its labours can be traced, except when thus marked; but in a thin soil, or in hard ground, a ridge is often driven along, which is distinctly raised above the ordinary level of the surface; and the mole-hill is only elevated where the earth is so fine and friable, that the removal of some part of it is necessary, to give the creature a clear course in its runs backward and forward. The creep or run is in a zigzag direction; and when the neighbourhood is very productive of its prey, exceedingly so, as if the animal was unwilling to pass out of so fertile a district. But for the most part it takes a straightforward course; and in the open space of a down, it passes through more than fifty paces of distance without lifting a heap, with a progress amounting to two or three human paces in a day, and the whole run is two hundred feet in length. In the course of this passage, advantage is taken of any obstructions which occur, as if conscious of the probability of pursuit; and the run is made to pass among the roots of dwarf furze, and even under a large stone, while, at irregular distances, openings are made, to allow of excursions on the surface, and the free admission of air. There are many lateral branches from the principal passage, but none of them extend to any great distance; for it seems wisely to avoid forming such a labyrinth as might confound itself in its daily course, or in its efforts to escape from an enemy, to whose depredations it is exposed even in its retreat. Its time of labour is chiefly at an early hour in the morning; but if everything be still it may be seen at work at other seasons. The slightest sound or movement of an approaching foot stops the work, and no further lifting of the earth will be attempted that day. These runs are mostly made towards the end of autumn; are this creature's hunting-grounds for food; are abandoned when the soil has been thoroughly searched through and through; and though they are formed with so much toil as to make it desirable not to desert it while there is anything to be done there, yet in a month or two the animal quits it for new ground, perhaps at a great distance, where the hunting promises better success.

"A favourite spot for its winter-quarters, and one it prefers at other seasons, is in enclosed fields, under the shelter of a hedge of high-piled earth, along the middle of whose base the run is carried, and in whose mass of mould it finds security from cold and from its natural enemies. The heaps it throws up are cast on the sides, and at intervals a lateral passage is driven into the field, to which, when the inducement is powerful, it transfers its principal operations; and there encounters its greatest hazards from the traps of the mole-catcher, and the pursuit of the weasel and the rat, with whom it fights furiously, but without success. When undisturbed, the mole often shifts its quarters; and in making a new selection, its choice seems to be much influenced by caprice. It makes these changes especially in the months of July and August; but I have known it to take excursions of removal to such distances, that no mark of its presence could be detected, in the month of January, if an open and moist season. A large part of such a journey must be along the surface; and it is probable that at all times this is its mode of emigration to distant places. In summer much of its time is thus passed in migrations from one field to another, because the hardness of the ground renders it difficult to throw up the soil, and follow up the worms, which

have sunk deeper down into the soil: it shows the same love of change in moist weather, when the ground is more workable; and the practice indeed seems a periodical variation of habit, common to it with the shrews (*Sorex*), which also are inhabitants of burrows, and to all which species it seems essential to health. |

"If not to its mind, the mole repeatedly changes its quarters; and though shut up in darkness, it reluctantly continues on the northern declivity of a hill, where it has little light and less heat, unless its other advantages are unusually great. Its migration from one district to another exposes it to great danger, as it is slow to escape, and little prepared to defend itself. The opening of a new track is often concealed in a heap of the soil which has been brought up from the interior; and at times it is firmly blocked up from within, but I have seen it left carelessly open. It is by these entrances that the weasel, the rat, and the larger vole (*Arvicola amphibia*) sometimes enter, and are themselves taken in the trap.

"The run is differently formed in spring, in consequence of a difference of object. Where fields are not large, the hedge is still the selected spot; on which account its nest is not often discovered. Mr. Bell has given a sketch of the skilful arrangements made for its safety at this time; but in districts where the hedge is chosen for defence, no other departure from its usual form is made than an enlargement of the space, and a more comfortable lining. | Fourteen young ones have been discovered in one nest; but, though the mole is not a social animal, it is hard to believe that they could have been littered by one mother. |

"The mole may sleep more in winter than in other seasons, but it is not its habit to become torpid at this time. In frost and snow, fine earth is often seen freshly turned up as evidence of its activity; but, as it is a creature of great voracity, and cannot endure long fasting, like many wild animals of that character, it is not easy to say how its wants are at this time supplied. A dead or living bird, numbed with the cold, is always a welcome morsel; but its track has not been seen in the snow in pursuit of it. It perceives the earliest approach of a thaw; and, after long seclusion, a heap may be seen protruding through the thin covering of snow as evidence of its sensibility to change of temperature: a circumstance more easily understood when we recollect that it is the radiation of heat from the inner parts of the earth which exercises the first influence in the change; and that it is because the air abstracts this heat more rapidly than the earth supplies it, that frost and snow are produced and continued. When, from changes in the atmosphere, this rapid abstraction ceases, the heat below becomes more sensibly felt; and this is first visible at the surface of the soil.

| "A good supply of drink is essential to the mole's existence; and its healthy condition is marked by a softness and moisture about the snout, where its most perfect organ of sensation is placed. The flexibility of that organ, and its command over it, are indeed exquisite; but it is not used in the operations of excavation and lifting. This is the work of the feet, neck, and the hinder part of the shoulder; and in these parts the mole is perhaps the strongest quadruped in existence, in proportion to its size. The heaps it throws up are not made simply by lifting; for the superfluous earth is collected at easy distances, and thrust along, until so much is accumulated as compels it to convey it out of the way, and then its work in tunnelling goes on again. |

"The mole has more enemies than it is supposed to have; for though its disappearance from a district is sometimes due to emigration, there must be other causes at work to account for their extirpation in particular localities. They may destroy each

other in their burrows, for they are exceedingly quarrelsome: the fox and weasel too are formidable foes; but the ceaseless war waged against them by man, the least excusable enemy they have, is the most destructive. Admitting that mole-heaps, and loosening of the soil by the runs made through a field, are inconveniences, and even injurious; and that it is unsightly to see a gentleman's lawn disfigured with these tumuli: but such annoyances may be either removed or turned to advantage; and it must not be forgotten that their destruction of more injurious creatures is considerable. If it is desirable to expel them from their haunts, it may be done effectually without destroying them; for their extirpation is sure to be followed by a fresh invasion. Evelyn says that they may be driven away by placing garlick in their runs; and perhaps assafœtida would be still more potent, if they must be drugged."—p. 276.

Anecdotes of Mice.—"A similar action to that of the fox has been observed in a little animal, to which it is not common to ascribe more than an ordinary degree of cunning or confidence in its own resources. In a bookcase of wainscot, impervious to light, in which articles were kept which were more agreeable to the taste of mice than books, when, at midday, the doors were suddenly opened, a mouse was seen on one of the shelves; and so rivetted was the little creature to the spot, that it showed all the signs of death, not even moving a limb when taken into the hand. On another occasion, on opening a parlour-door, in broad daylight, a mouse was seen fixed and motionless in the middle of the room; and, on advancing towards it, its appearance in no way differed from that of a dead animal, excepting that it had not fallen over on its side. Neither of these creatures made an effort to escape, and were taken up at leisure; nor had they received any hurt or injury, for they soon displayed every mark of being alive and well."—p. 202.

Anecdote of an Owl.—"A brown owl (*Strix aluco*) had long been in the occupation of a convenient hole in a hollow tree; and in it for several years had rejoiced over its progeny, with hope of the pleasure to be enjoyed in excursions of hunting in their company: but, through the persecutions of some persons on the farm, who had watched the bird's proceedings, this hope had been repeatedly disappointed, by the plunder of the nest at the time when the young ones were ready for flight. On the last occasion, an individual was ascending to their retreat, to repeat the robbery, when the parent bird, aware of the danger, grasped her only young one in her claws, and bore it away; and never more was the nest placed in the same situation."—p. 244.

Nesting of the Martin.—"In nest-building the martin (*Hirundo urbica*) manifests more confidence in man than any of the feathered tribes. Their time for working in the erection of these clay tenements is in the early part of the day, so that the mortar may have the benefit of the drying influence of the sun, the afternoon being employed in hawking after food. But in a situation near the sea, which was covered by the tide at their usual time for labour, these birds have exercised so much reflection on the natural phenomena of the ebb and flow of the tide, as to employ the morning in collecting food, reserving their labour for the time when, they reasoned, their materials would be accessible to them. The mortar is conveyed in a pellet on the top of the bill; and they are careful not to hasten the structure too fast, lest its own weight, while loaded with moisture, should bring it to the ground. An instance is remembered where, from some such cause of suspicion as to the stability of the edifice, a martin had recourse to the wonderful expedient of working in a straw, as a binding beam along the curve of the structure! The ends were, it seems, secured without dif-

ficulty, but the efforts of the little builder to bend down the arch formed by the rising of the middle were in vain; for, whenever the pressure was removed, it persisted in maintaining its elasticity. The baffled bird glanced about, as if in contemplation of the difficulty, and seemed ready to receive any suggestion which might be offered, till, tired of watching the invariable result of so many efforts made in vain, the observer walked on. Returning an hour or two afterwards, the little architect was observed to have resorted to the only plan which could be effectual: he had left the ends free, which thus projected a little from the mortar, and the structure was complete at last."—p. 215.

Aristocratic Taste of the Rook.—"The situation of the nest of the rook is, more than that of any of its natural family, a matter of taste; its position never being found wild in the woods, although the whole colony, in very stormy weather, will quit the ordinary roosting-trees to resort thither for shelter. The association of these birds in the neighbourhood of a human habitation is clearly not, in the first place, for protection; for however quick the feathered races are to discern a friendly feeling in the human race, a cottage, though surrounded with trees, has no power to attract them, while an aristocratic mansion in the Gothic style of building is irresistible; and a rook has been known to occupy a tree not higher than twenty feet from the ground, rather than remove to a distance from so dignified a neighbourhood; though there was no bond of attachment arising from long association of affection, for the building in its present condition is of no remote date."—p. 213.

Peculiar Trait in the Goldcrest.—"The little goldcrest (*Regulus cristatus*) is a timid creature, and yet it will sometimes approach so near to a man as to appear indifferent to his presence; but this absence of apprehension seems to proceed rather from the inability of its organs or its imagination to comprehend such a mass and mountain of being as a man while standing still; for if he put himself in motion, the bird flies away in a fright at its utmost speed. When this pretty diminutive bird is on the branch of a tree, if you strike the body of the branch with a stick or stone, though at some distance from the twig on which it is perched, the shock brings it at once to the ground, and it may be taken with the hand; when, if time be allowed it, the bird soon revives, and may, if you are humanely disposed, be again restored to liberty."—p. 203.

Habit of the Guillemot.—"I have watched with much interest the proceedings of this bird when capturing the stragglers of a school of young mullets (probably *Mugil chelo*), and the admirable skill with which their dispersion was prevented, until a full stomach had been secured. It is the nature of this bird, as well as of most of those birds which habitually dive to take their prey, to perform all their evolutions under water with the aid of their wings; but, instead of dashing at once into the midst of the terrified group of small fry, by which only a few would be captured, it passes round and round them, and so drives them into a heap; and thus has an opportunity of snatching here one and there another, as it finds it convenient to swallow them; and if any one pushes out to escape, it falls the first prey of the devourer."—p. 192.

Habits of the Cormorant, Shag and Loom.—"It is amusing to observe the proceedings of the cormorant, shag (*Pelecanus carbo* and *P. graculus*), and the looms (*Colymbi*), in dealing with the refractory subjects which they sometimes fish up in the course of their researches under water. If the prize be a crab, it is taken to the surface, and, fully aware of the danger of attempting to swallow it whole, it is there dropped, and a smart peck of the bill is made at the legs. These are either knocked off by the blow,

or the crab is induced to throw them off, according to the known practice of these creatures when injured. Each of these is then seized and swallowed in succession; and the body, by this time become a mere lump, is gulped down last of all. A lance or shanny, if caught across the mouth or held by the tail, is flung aloft, and caught in a convenient posture as it falls. If the prey be a flounder or plaice, it is thrown on the surface, and pecked so violently as to break or dislocate the firm arrangement of transverse bones, and thus deprive the muscles of their strong contractile power, by which so rigid an obstruction was thrown in the way of swallowing. It is then rolled up into a cylinder, and easily disposed of. A close observer of nature informed me, that his attention was directed to a cormorant, which appeared to be much distended about the neck and throat; but, while watching its proceedings, the bird discovered his presence, and endeavoured to escape, by which means its attention became distracted, and an eel started from its jaws, and employed much active effort to effect its retreat. Unwilling to lose so valuable a morsel, the bird pursued it, and was again successful; but it was not now in haste to ingulph its prey. Repeatedly and violently did it peck the fish through the whole of its length, and then again it seized it across its bill; but, still finding it capable of too much activity, it continued to peck it, until the whole of its powers of contortion were subdued, and there was no further risk of its again effecting an escape from its dungeon."—p. 195.

A few Remarks on the Provincial Names of Birds. By the Rev. JAMES SMITH.

I perceive, from certain notices in your excellent and most useful publication, that you are anxious to obtain the *provincial* names by which natural objects are known throughout the various localities in the kingdom. A list of such names would, I conceive, be of no inconsiderable importance to every naturalist. They will be found to differ greatly in different districts; and it no doubt frequently happens that a particular name is believed to indicate an animal hitherto unknown or unseen, which, by another name used in another locality, would be immediately recognized as one of familiar, and perhaps daily, occurrence. In the parish, for example, where I reside, although it is fully ten miles from the nearest part of the sea coast, the dunlin (*Tringa variabilis*) comes up regularly to breed on an extensive tract of heath interspersed with marshes, and is here, as well as in the adjoining parts of the country, universally known by the name of the *dorbie*. At the sea coast, where it is said to breed, although I have never seen a specimen of its egg, the purple sandpiper (*Tringa maritima*) obtains the name of the *blin*, that is, the *blind dorbie*, from a seeming unconsciousness, which it manifests, of approaching danger. The tract of heath already mentioned shows, every now and then, a piece of ground destitute of vegetation, and covered all over with small stones. I am informed by the older inhabitants, that formerly these spots were frequented in the breeding-season by the ring dotterel (*Charadrius Hiaticula*). This elegant little bird is, I am sorry to say, no longer to be seen here. It is common, however, on all the low lying and sandy parts of the coast, and is widely known by the name of *sannie laverock*, that is, *sand lark*. On a particular portion of the same

heathy tract, covered all over in summer with the white and conspicuous plant called here the *cat's tail*, a few pairs of the curlew (*Numenius arquata*) are annually found breeding. The provincial name of this conspicuous bird is in Scotland the *whaup*. This name it has doubtless obtained from the note which it most commonly utters during its abode by the sea-side. The two syllables, *whaa-up*, when pronounced by a Scotchman, are, in reality, no bad imitation of that lengthened and peculiar whistle which the curlew emits, on being disturbed, during the seasons of autumn and winter. It appears to me that Mr. Yarrell is altogether mistaken in the observations which he makes on the word *whaup* (British Birds, ii. 512), and that the name given to the goblin, of whom he there speaks, was in reality adopted from that, by which the curlew has been known in Scotland from time immemorial. Its cries during the period of breeding are quite different, are very varied, and, in some cases, of a singular and interesting nature. One of these is exactly *cour-lee*, showing that the French name, *courlis*, is more appropriate than our own of *curlew*, which would seem to have been formed from it. In the same part of this parish the golden plover (*Charadrius pluvialis*) breeds annually in great numbers. It is known here by the simple name of *pliv-er*. While engaged in incubation, and afterwards, when associated in flocks previously to their departure for the sea coast, the cries of these birds are varied and wild, —most of them shrill, but some, on the contrary, warbling and not unmusical. One of them is exactly imitated by the Scotch words *shaw beer*, that is, *sow barley*; and, when this well-known cry is first heard by the inhabitants, it is supposed to be an intimation to the husbandman that it is time for him to begin carrying that part of his operations into effect. When in a flock, which sometimes about the beginning of September amounts to a hundred birds and more, the evolutions of the plovers, as they move through the air, are remarkably interesting and beautiful. They wheel about in all directions, and often in regular segments of a circle. As in the case of many of the shore birds, and especially of their congener the ring dotterel, or plover, their backs, also, and their breasts are turned, in the most rapid manner, alternately to the spectator; and an extended and most brilliant flash of white is immediately succeeded by a more sombre shade of yellowish-brown. A rushing noise is, at the same time, produced in the air by the quick and downward motion of their wings. In the same locality, also, and during the evenings of spring, the air is rendered vocal by the singular noise produced by the snipe (*Scolopax Gallinago*), which is known by the name of the *mire-snipe*, and sometimes by that of the *heather bleater*, from the goat-like bleating which it raises while wheeling about in the air. This peculiar sound I have never heard it produce, except when it was descending with great velocity, and in an oblique direction. Here, moreover, are great numbers of the red grouse (*Tetrao Scoticus*), which is familiarly known as the *meer-hen*, that is, the *moor-hen*. Two of the notes, which are frequently uttered, and always in a bass key, by this interesting bird, are exactly the same in sound as the Scotch words, *come hame*, that is, *come home*. When sitting on her eggs, the red grouse is sometimes remarkably tame. On one occasion, an individual, so occupied, allowed me not only to stand and look at her, but to stoop down, and to scratch and stroke her back.

On the sea coast in the neighbouring parish of Gamrie, and at a particular part of the magnificent cliffs by which the Moray Firth is there bounded, there is an extensive breeding-place of those birds which are known by the name of *sea-fowl*. The species frequenting this spot are the common guillemot (*Uria Troile*), or, as it is called in this

part of the country, the *queet*; the black guillemot (*Uria Grylle*), or the *testie*; the razor-bill auk (*Alca Torda*), or the *cooter*, the Scotch word for *couter*, from the resemblance which there is between that part of a plough and the bill of the bird; the puffin (*Fratercula arctica*), or the *Tammy Norie*, and, on the coast farther to the south, at the immense rock of Dumbye, the *Tammy Cheekie*; the kittiwake, a name made from its cry (*Larus tridactylus*), or the *kittieweeik*, or simply the *kitty*; the herring gull (*Larus argentatus*), or the *pew-il*, which name is an exact imitation of its quickly-repeated cry; and the cormorant (*Pelecanus Carbo*), or the *scrath*, or *scart*. The numbers at this breeding-place are yearly growing less and less. This circumstance, which is to be regretted, is, without doubt, to be principally, if not entirely, attributed to the annoyance and destruction occasioned to these harmless and beautiful birds by parties, as they are called, of pleasure, who repair to their abode almost daily during the season of incubation, and consider it as a harmless amusement wantonly to shoot them by hundreds, and to leave them, dead or wounded, at the bottom of those rocks, of which they ought ever to be regarded as a living, a conspicuous, and a most interesting ornament. On the sandy open parts of the same coast the lesser tern (*Sterna minuta*) is known by the name of the *clett*, which expresses the peculiar cry by which the bird is distinguished. A larger tern, the specific name of which I have not yet ascertained, has obtained, on the sea coast near Peterhead, the name of the *tearlie*, a word which is a most correct imitation of its usual cry. On the same coast, one of the divers, probably the red-throated (*Colymbus septentrionalis*), which is the most commonly distributed of the genus, has, from its cries, derived the strange-sounding name of *harl loot*. Among the marshy ground in the vicinity of the sea, and all along the coast, is found the redshank (*Totanus Calidris*), which breeds abundantly, and which is known by the name of the *clee*, from one of the notes uttered by it while on the wing.

To come from trivial and provincial names, to what is termed scientific nomenclature. As a general remark, it would, I think, be desirable that the specific name of an animal should, if possible, contain an allusion to some peculiarity, either in appearance, structure, or habits, by which the particular species is distinguished from all the others, of which the genus that it belongs to may happen to be composed. On this account, I have a most decided objection to all scientific names ending in *oides*; and I am, therefore, sorry to see, by the Zoologist (Zool. 1778), that the name of *Fuligula ferinoides* has been given to the newly-discovered pochard called after Mr. Paget. The meaning, if it has any, of *Fuligula ferinoides*, is the *Fuligula* resembling the *ferina*. But are not this pochard and the *ferina* each a distinct species, belonging, both of them in an equally independent degree, to the genus *Fuligula*? Why, therefore, should the newly-discovered bird, if it is really a distinct species, be associated with a species which is already in existence? And why, instead of being arranged simply and independently by itself, under its proper genus, like all the others of which that genus is composed, should it be degraded into a sort of inferior species, or satellite, attending in the wake of its more fortunate companion, the *ferina*? The most ludicrous name of this description which I have ever seen, is, if I recollect right, the *Regulus Reguloides*. This evidently must mean the *Regulus* having the appearance of the *Regulus*, or, in other words, the *Regulus* which resembles itself. The bird must surely have been named in Ireland. Nothing, it appears to me, is more calculated to impede the progress of real knowledge in natural history than the rage which prevails for reckless changes in nomenclature, and especially for the invention of such names

as these. Could not some mark by which Paget's pochard is distinguished, such as the small white bar across the wing, have been selected as the ground for a specific appellation?

JAMES SMITH.

Manse of Monquhitter by Turriff, Aberdeenshire,
September 21, 1847.

Occurrence of the Bar-tailed Godwit near Banff.—On the 3rd of this month there was shot, on the sea shore near Banff, a specimen of the bar-tailed godwit, the *Limosa rufa* of ornithologists. It was killed, and afterwards mounted, by Mr. Thomas Edward, an individual of whom I took the liberty to make mention on a former occasion in the pages of the Zoologist. So far as I am aware, the bird in question had never been before observed in this particular locality, nor indeed in this district of the country. As it is only of late, however, that anything like a taste for natural history has been created in the public mind, it is quite possible, or rather it is probable, that its occurrence here may have hitherto been overlooked. From the remarks of naturalists it would appear that its line of migration is in general farther to the east. It was evidently on its return from those high latitudes where it is understood to breed, no instance of its nest having, as yet, been found in Britain. The tide was at the moment receding; and the bird was busily employed in following the waves, probing the wet sand all the while with its bill. It uttered no cry, and appeared careless of danger. It is a male, and exhibits an intermediate and interesting state between the winter and the summer plumage. The rich bay, which in the nuptial season adorns the breast, has disappeared, and has given way to a pale, but delicate and beautiful, sand colour, which in time would have been succeeded by the pure white of the garb of winter. On the belly there is already a mixture of white along with the peculiar colour above mentioned. The feathers on the back are brown, with an edging of pale rufous. The bill is about two inches and a half in length, and, towards the extremity and at the tip, has a decided curve upwards, forming in this manner a beautiful link in that particular structure of Nature, which, in the present class of birds, begins perhaps with the greenshank, and obtains its full development in the singular configuration exhibited by the bill of the avocet.—James Smith; Manse of Monquhitter by Turriff, Aberdeenshire, September 21, 1847.

Occurrence of the Avocet at the Land's End.—A specimen of this bird was sent to this place for preservation, by James Trembath, Esq., last evening, near whose residence, within a mile of the Land's End, it was shot. It appears to be a young bird of the year, from the lesser scapularies being deeply margined with dull rufous. This bird is of very unusual occurrence in Cornwall, and I have never before the present instance seen an example in the flesh.—Edward Hearle Rodd; Penzance, September 14, 1847.

The Sea Serpent.—Having seen much notice taken in the 'Zoologist' of the question of the great sea serpent, allow me to subjoin an extract from the log-book of a very near relative, dated August 1st, 1786, on board the ship 'General Coole,' in lat. 42° 44' N. and long. 23° 10' W. "A very large snake passed the ship; it appeared to be about 16 or 18 feet in length, and 3 or 4 feet in circumference, the back of a light ash colour, and the belly thereof yellow." According to the log the ship was becalmed at the time. You may rely on the correctness of this, and any one desirous of satisfying himself may see the original log.—*S. H. Saxby; Bonchurch, Isle of Wight, September 8, 1847.*

Nest of the Shanny attended by a Stickleback.—"In the month of May, 1845, I obtained a nest formed of seaweeds, and in all respects like those which have already been described; and when it was discovered hanging from the rock, two individuals of the fifteen-spined stickleback were in close attendance on it. As, on examination, some of the ova were seen to be springing into life, much attention was paid in watching their development, which was gradual, and occupied several days, proceeding as if the ova in different portions of the mass had been deposited at small intervals of time. As the young moved about the vessel with much activity, they coveted the shelter of some floating weed; but descended eagerly to assail and tear such of their brethren as died and fell to the bottom. Being from the first impressed with the conviction that they were the young of the fifteen-spined stickleback, I was much surprised to notice the great difference of their shape from that of their supposed parent, more especially in the parts before the eyes, which, instead of being elongated and slender, were short and round. In consequence of this they were closely examined with glasses, and drawn with the aid of a microscope of low power; and though I failed to detect satisfactorily the ventral fins of that fish (chiefly perhaps from their slender form and transparency), yet, from the declivity of the head, protuberance of the belly, the pectoral fin, and the length of the dorsal and anal fins, which in some specimens were continuous with the caudal, and in others separated by a slight notch, I had no hesitation in referring them to the common shanny (*Blennius pholis*)."—*Couch's 'Illustrations of Instinct,' p. 257.*

Occurrence of the Sword-fish at Boston.—A specimen of the sword-fish (*Xiphias Gladius*) was taken last month in the deeps off Boston, Lincolnshire. The sword measured 2 feet 8 inches, and its total length was 8 feet 6 inches; it weighed 8 stones 7 lbs. I have not been able to obtain the particulars of its capture, but it was bought by the present owner for 8s. He has had it stuffed, and expects to obtain a good price for it. I believe it is a very rare visitant upon these coasts. Yarrell says that it was once taken in the Severn, where a man bathing was struck by it, and received his death-wound. A dead one was found off the coast of Essex in 1834. One was exhibited at Brighton in 1796, and another taken in Bridgewater river in 1834. I believe it has never been taken off the coast of Norfolk.—*E. E. Montford; East Winch, near Lynn, Norfolk, September 13, 1847.*

Notice of a 'List of British Lepidoptera, by Henry Doubleday.'

It frequently happens that when a work has long been talked of, it disappoints us at last: in the present instance the reverse is the case: nothing can be more carefully compiled than the list before me, nothing more completely adapted to the purpose for which it is intended. In the present unsettled state of *generic* nomenclature, the author has adopted the wisest possible course, by placing three or four of the more favourite generic names at the head of each group of three or four species which are supposed to be allied to each other; so that in cutting out these names for the purpose of labelling a cabinet, the entomologist may exhibit his own taste, or the profoundness of his own learning, by adopting the generic name that may be most agreeable to him. Seeing that a genus is a scientific fiction, generic nomenclature must ever be unsettled, and the more extended our researches, the more accurate our investigations, the greater will be the number of genera, and the more confused and puzzling their application. In species, on the contrary, however we may occasionally differ as to their limits, we have an acknowledged guide; we place under *one* specific name *all* those individuals which, as we suppose, transmit their own likeness from generation to generation. Thus the progenitors of our little Pamphilus were known to Aristotle under precisely the same form as their descendants are known to us; and the future individuals of this butterfly will doubtless remain the same (*malgré* the vestigians) to the end of time. We have to search out the earliest name given to this butterfly, and have no choice but to assign it this earliest name. The author of the present list has done this with the greatest care, printing this earliest name *first* in order, and in a larger type, and all subsequent names below it in the column, and in a smaller type. Now the followers of Linneus may call this insect a Papilio; the followers of Boisduval, a Satyrus; the followers of Stephens, an Hipparchia; the followers of Westwood, a Lasiommata; the followers of Hübner, a Cœnonympha; the followers of each future author, a name yet uncoined; and each of these different decisions will display equally good taste, correct judgment and scientific research: but all *must* agree in the specific name of Pamphilus; concerning *that* there is no choice, unless one arose from the difficulty which occasionally occurs in fixing the precise date of publication. It is well known, and therefore may be recorded without offence, that our publishing entomologists, in former years, trusted entirely to the figures and descriptions of continental authors, and never took the trouble to examine authentic specimens and compare them with our own: thus it continually happened that the English author, even with the *named* species in his hand, failed to identify it by the figure or description: a new name was consequently given, and thus the same species very frequently bore *one* name on the Continent and *another* in Britain. The author of the present list has cleared away a mass of these errors by the actual examination and comparison of authentic specimens, and thus his labours have tended materially to alter our previously received nomenclature; but I am rejoiced to say, that these alterations have in no case been made unadvisedly, nor unless the circumstances of the case imperatively required them. Most cordially do I recommend this list to every entomologist, and most confidently do I anticipate that its use in this country will become general. In order, however, that the reader may thoroughly understand its plan, a page is introduced as a specimen of the whole.—*Edward Newman.*

- PYGMÆOLA.**
Pygmæola, Doubl.
- AUREOLA.**
Aureola, Hub.
- MUSCERDA.**
MuscERda, Hub., Och., Boisd.
- MINIATA.**
Miniata, Fors.
Rosea, Fab., Och.
Rubicunda, Hub.
- MESOMELLA.**
Mesomella, Linn.
Eborina, Hub., Och.
- SETINA, Steph.**
- IRRORELLA.**
Irrorella, Linn.
Irrorea, Hub.
Roseida, Steph. (non Fab.), var.
- NUDARIA, Haw.**
- SENEX.**
Senex, Hub.
- MUNDANA.**
Mundana, Linn.
Hemerobia, Hub., var.
- CALLIMORPHA, Boisd.**
- DOMINULA.**
Dominula, Linn.
- EUTHEMONIA, Steph.**
- NEMEOPHILA, Steph.**
- RUSSULA.**
♀ Russula, Linn.
♂ Sannio, Linn.
- PLANTAGINIS.**
Plantaginis, Linn.
Hospita, W. V., var.
- ARCTIA, Steph.**
- CHELONIA, Lat., Boisd.**
- EYPREPIA, Curt.**
- VILLICA.**
Villica, Linn.
- CAJA.**
Caja, Linn.
- PHRAGMATOBIA, Steph.**
- SPILOSOMA, Curt.**
- ARCTIA, Boisd.**
- FULIGINOSA.**
Fuliginosa, Linn.
- LUBRICIPEDA.**
Lubricipeda, Fab.
Radiata, Haw., var.
- URTICÆ.**
Urticæ, Esp.
Papyratia, Marsh.
- MENTHRASTI.**
Menthrastræ, Fab.
Walkeræ, Curt., var.
- MENDICA.**
Mendica, Linn.
- LIPARIS, Och.**
- PSILURA, Steph.**
- HYPOGYMNA, Steph.**
- LEUCOMA, Steph.**
- PORTHESIA, Steph.**
- MONACHA.**
Monacha, Linn.
- DISPAR.**
Dispar, Linn.
- SALICIS.**
Salicis, Linn.
- AURIFLUA.**
Auriflua, Fab., Hub., Boisd.
Chrysorrhæa, Haw., Steph.
- CHRYSORRHÆA.**
Chrysorrhæa, Linn., Boisd.
Phæorrhæa, Curt., Haw.
Auriflua, Steph.
- ORGYIA, Och.**
- LÆLIA, Steph.**
- DASYCHIRA, Steph.**
- DEMAS, Steph.**
- CÆNOSA.**
Cænosa, Hub.
- PUDIBUNDA.**
Pudibunda, Linn.
Juglandis, Hub.
- FASCELINA.**
Fascelina, Linn.
- CORYLI.**
Coryli, Linn.
- GONOSTIGMA.**
Gonostigma, Fab.
- ANTIQUA.**
Antiqua, Linn.
- CLASIOCAMPA, Curt.**
- BOMBYX, Boisd.**
- NEUSTRIA.**
Neustria, Linn.
Billineatus, Haw., var.
- CASTRENSIS.**
Castrensæ, Linn.
- ERIOGASTER, Germ.**
- LANESTRIS.**
Lanestræ, Linn.
- TRICHIURA, Steph.**
- CRATÆGI.**
Cratægæ, Linn.
- PÆCIOCAMPA, Steph.**
- POPULI.**
Populi, Linn.
- LASIOCAMPA, Steph.**
- BOMBYX, Boisd.**
- RUBI.**
Rubi, Linn.
- QUERCUS.**
Quercus, Linn.
Roboris, Steph., var.
- TRIFOLII.**
Trifolii, Fab.
Medicaginis, Hub., var.
- ODONESTIS, Germ.**
- POTATORIA.**
Potatoria, Linn.
- GASTROPACHA, Curt.**
- LASIOCAMPA, Lat., Bo.**
- QUERCIFOLIA.**
Quercifolia, Linn.
- SATURNIA, Schr.**
- CARPINI.**
Carpini, Bork.
Pavonia var, minor, Linn.
- ENDROMIS, Och.**
- VERSICOLOR.**
Versicolor, Linn.
- COSSUS, Fab.**
- LIGNIPERDA.**
Ligniperda, Fab.
Bombyx Cossus, Linn.
- ZEUZERA, Lat.**
- ÆSCULI.**
Æsculi, Linn.
- ARUNDINIS.**
Arundinis, Hub.
- HEPIALUS, Fab.**
- HUMULI.**
Humuli, Linn.
- VELLEDA.**
Velleda, Esp.
Mappa, Don.
Carnus, Steph. (non Fab.), var.
- SYLVINUS.**
Sylvinus, Linn., Esp.
Lupulina, Hub.
- LUPULINUS.**
Lupulinus, Linn.
♀ Obliquus, Fab.
Fuscus, Haw.
Angulum, Haw., var.
Obliquus, Haw., var.
Nebulosus, Haw., var.
- HECTUS.**
Hectus, Linn.
♀ Jodutta, Haw.

*Descriptions of New British Lepidoptera, by Henry Doubleday, Esq.*Genus LITHOSIA, *Fab.*

Sp. 1. LITHOSIA STRAMINEOLA.*

Lithosia flava, Haworth, Stephens.

Antennæ, head, thorax and abdomen pale straw-yellow; anterior wings pale yellow or straw colour, usually immaculate, but sometimes having a large cinereous patch towards the apex; posterior wings, ciliæ and legs pale yellow.

This species has been considered identical with *Lithosia flava* of Fabricius, but the description is so vague that it is impossible to be certain whether our insect is the species described under the above name as a native of Italy. It may possibly prove to be only a variety of *L. griseola*.

Sp. 2. LITHOSIA PYGMEOLA.†

Head, thorax and abdomen pale cinereous, tinged with yellow; anterior wings very narrow, cinereous; the costa pale straw colour nearly to the apex of the wing; posterior wings whitish, the anterior margin broadly shaded with cinerous; the wings are similarly marked on the under surface, but the yellow margin of the anterior wings is more distinct.

This small species, which appears to be new, has been taken on the coast of Kent among rushes. The larva probably feed upon some species of lichen growing upon the ground among the rushes and sedge.

Genus HYDRÆCIA, *Guenée.*

Sp. 1. HYDRÆCIA PETASITIS.‡

Head, thorax and abdomen deep brown; anterior wings dull brown, with a darker central fascia, in which are the usual stigmata; the hinder margin of the wing beyond the fascia is rather paler than the rest of the wing, deepening in colour towards the ciliæ, which are fuscous, paler at the base; posterior wings immaculate, pale fuscous.

This species differs from *H. micacea* in being rather larger, the colour deeper, and the markings more obscure, and in having fuscous posterior wings. I have named it *Petasitis* from its having been taken flying over the butter bur (*Tussilago Petasites*, Linn.), on which the larva probably feeds.

Genus HADENA, *Ochsenheimer.*

Sp. 1. HADENA ASSIMILIS.§

Anterior wings coppery black, with a ferruginous spot near the base; a copper-coloured striga before and another behind the middle, the latter considerably curved

* Alis omnibus stramineis, immaculatis. (Expansio alarum, 1 unc. 4—6 lin.)

† Alis anticis angustissimis, margine anteriori stramineo, posticis albicantibus, margini anteriori late cinereo. (Exp. alar. 10 lin.)

‡ Alis anticis obscure fuscis, fasciâ saturatori, stigmatibus pallidioribus, posticis pallide fuscis. (Exp. alar. 1 unc. 10 lin.—2 unc.)

§ Alis anticis fusco-cupreis, strigis ordinariis stigmatibusque cupreis: posticis fuscis. (Exp. alar. 1 unc. 8 lin.)

from the costa towards the hinder margin of the wing; between these strigæ the stigmata, which are cupreous, are placed; on the hinder margin of the wing is the usual striga, which is composed of copper-coloured lunules, the W mark being almost obliterated; on the costa, near the apex, are three pale spots, and a minute white dot on each of the nervures between the second and third striga; ciliæ spotted with black and cupreous; posterior wings fuscous, scarcely paler on the disk; ciliæ reddish. Head, thorax and abdomen deep fuscous, sprinkled with coppery dots.

This species is very closely allied to *H. adusta*, and seems intermediate between it and *H. satura*, which it much resembles; it differs from the former in having the antennæ less ciliated, the strigæ slightly different in form, and in the absence of the W mark so conspicuous in *H. adusta*; the posterior wings are also much deeper in colour. First taken in Scotland by Mr. Weaver, in 1846, and this season by a friend of Mr. Stainton's.—*Henry Doubleday*.

Captures of Lepidoptera at Lewisham, by means of Light.

Biston prodromaria. Four, April 5 to 8.

Cerura bifida. Two, May 20 and August 12.

Geometra lunaria. Three, June 5.

Eurymene dolabraria. One, June 7.

Eupithecia succenturiata. Three, July 6, 11 and 14.

Eupithecia pulchellata. Six, July 10 to August 6.

Eupithecia coronata. One, July 11.

Eupithecia subfulvata. One, August 17.

Phycita formosa. Upwards of thirty, many of them in very bad condition, July 10 to 31.

Phycita bistriga. Two, July 11 and 13.

Phycita binavella. One, July 14.

Phycita pinguis. Five, July 29 to August 17.

Crambus falsellus. Ten, July 10 to August 6.

Euchromia purpurana. Three, July 11 to 13.

Aglossa cuprealis. Three, July 11 to August 5.

Zeuzera Æsculi, ♂. One, July 12.

Carpocapsa rufana. Six, July 12 to 20. This appears to me a very distinct species.

Anesychia dodecea. One, July 14.

Emmelesia rusticata. One, July 14.

Emmelesia bifasciata. Two, August 17 and 22.

Cochylis griseana.* Three, July 14 and August 17.

Lobophora sexalisata. One, July 16.

Sericoris quadrimaculana. Two, July 21 and September 13.

Hylophila quercana. One, August 1.

Ptilodontis palpina. Four, August 2 to 9.

Cerura furcula. One, August 12.

Geometra fuscantaria. Six, August 9 to 31.

* By this name I mean the *griseana* of Bentley's cabinet; it is not the *griseana* of Stephens's cabinet.

Xanthia xerampelina. Two, August 30 and September 10.

Latterly I have taken two *Charæa cespitis*, and several *Geometra tiliaria* and *erosaria*, and *Trichiura cratægi*.—*H. T. Stainton*; *Mountsfield, Lewisham, September 16, 1847*.

Occurrence of Sphinx Convolvuli at Battel.—A fine female has just been brought to me alive; it was found in a hop bin.—*J. B. Ellman*; *Battel, September 13, 1847*.

Capture of Xanthia Centrago near Bristol.—This rare and beautiful species seems to have occurred in unusual plenty this season. Several have been captured in the north of England, and on the 21st of August I had the pleasure of taking a fine specimen on an ash tree on Durdham Downs; between this date and the 9th of September I captured upwards of thirty specimens: it was also taken in some plenty by other collectors in the neighbourhood. I never met with this species before, though I understand it has occurred in the same locality for some years past.—*P. H. Vaughan*; *Redland, Bristol, September 13, 1847*.

Capture of Porrectaria Laricella of Hübner.—I took nine specimens of this silvery little moth on the fences at Dulwich, Herne Hill and Camberwell, during the first week in July. This is, I believe, the first time it has been found in England; at any rate it is a new species to our list of Lepidoptera.—*W. Thomson, Jun.*; 6, *Loudoun Place, North Brixton, September 14, 1847*.

Descriptions of British Bees belonging to the Genus Andrena of Fabricius. By *FREDERICK SMITH, Esq.*

(Continued from page 1753).

Sp. 46. *ANDRENA FULVICRUS*.

Melitta fulvicrus, Kirby. *Melitta contigua*, Kirby, *var. male*.

Female.—(Length $4\frac{1}{2}$ — $5\frac{1}{4}$ lines). Black; the face clothed with short pale fulvous pubescence; at the base of the antennæ, on the vertex, and along the inner margin of the eyes, it is black. Thorax, the disk thinly clothed with fulvous pubescence; on the sides and on the metathorax it is of a paler colour; the tegulæ rufo-piceous; the wings hyaline, slightly clouded at their margins, the nervures pale ferruginous; the pubescence on the legs fulvous; the floccus is pale fulvous, the scopa bright fulvous; the tarsi beneath ferruginous. Abdomen ovate, very finely punctured, rather convex; all the segments have a marginal fascia of pale fulvous hair; the apical fimbria black; beneath, the segments have a thin fringe of pale hair, on the apical one it is black.

Male.—(Length $4\frac{1}{2}$ —5 lines). Black; the face clothed with black

pubescence, intermixed with fulvous; the antennæ not quite so long as the head and thorax. Thorax clothed with pale ochraceous; the wings hyaline, very slightly clouded at their margins. Abdomen ovate-lanceolate, the three basal segments thinly clothed with short ochraceous pubescence; on the apical segments it is black; the margins of the segments, excepting the basal one, have a fascia of ochraceous hair.

The specimens described were captured *in coitu*. The pubescence in this species is very subject to fade, particularly in the males; it becomes white in that sex. Mr. Kirby's *M. contigua* is a variety of the male. The species is very generally distributed, and is very abundant: it appears in April and May.

Sp. 47. *ANDRENA CHRYSOSCELES.

Melitta chrysosceles, Kirby.

Female.—(Length 4—4½ lines). Black; on the clypeus a little silvery pubescence, and a few pale fulvous hairs at the base of the antennæ and along the margin of the vertex; a line of short fulvous pile along the inner margin of the eyes; one or two of the apical joints of the antennæ rufo-fulvous beneath. Thorax, the pubescence is fulvous on the disk, but very thin; on the metathorax it is thicker and paler; on the disk, parallel with the tegulæ, on each side is a slight scratch; the tegulæ testaceous, as well as the nervures; the wings iridescent, sub-fuscous, slightly clouded at their margins; the legs nigro-piceous; the floccus white; the scopa of a golden yellow, having in some lights a white reflection; the posterior tibiæ and all the tarsi testaceous. Abdomen sub-ovate, shining, and finely punctured; the margins of the second, third and fourth segments have a white fascia, the two first interrupted; the apical fimbria fulvous.

Male.—(Length 3½—4 lines). Black; the clypeus pale yellow, with two black spots. Thorax, the pubescence on the disk pale fulvous, on the sides and legs beneath it is white; the tegulæ and nervures testaceous; the wings iridescent, hyaline, and slightly clouded at their margins; the apex of the posterior tibiæ and all the tarsi testaceous. Abdomen lanceolate, the margins of the segments narrowly piceous, having laterally a slight fringe of pale hair; that on the apical segment is pale golden yellow.

This is rather a local species: I never found it in any abundance. It is met with at Hampstead, Charlton, Weybridge, &c. It is partial

to hard-trodden pathways in which to construct its burrows. I have observed *Nomada furva* entering its nests. It appears in June.

Sp. 48. *ANDRENA DORSATA*.

Melitta dorsata, Kirby.

Female.—(Length $4\frac{1}{2}$ lines). Black; a little pale fulvous pubescence along the inner margin of the eyes below the base of the antennæ. Thorax clothed above with short fulvous pubescence, paler at the sides, and on the metathorax, on each side of which it is thickly clothed; the tegulæ ferruginous; the wings slightly fuscous and iridescent; the legs rufo-piceous, having a pale fulvous pubescence; the posterior tarsi and the apical joints of the anterior and intermediate tarsi rufous, as is also the apex of the posterior tibiæ; the floccus nearly white, and the scopa fulvous. Abdomen sub-ovate, finely punctured; the margins of the second, third and fourth segments have a white fascia, the first interrupted in the centre; the anal fimbria fulvous.

This is not a very common species. I have taken it at Weybridge, in August. I do not know its male.

Sp. 49. *ANDRENA WILKELLA*.

Melitta Wilkella, Kirby.

Female.—(Length $5-5\frac{3}{4}$ lines). Black; the antennæ piceous beneath; a little pale fulvous pubescence along the inner margin of the eyes. Thorax thinly clothed with pale fulvous; the tegulæ ferruginous; the wings sub-testaceous; the pubescence on the legs pale fulvous; the posterior tibiæ and basal joint of the tarsus pale rufous; the floccus pale fulvous; the scopa fulvous; the claws rufo-piceous. Abdomen rather oblong-ovate; the second, third and fourth segments have on each side a white fascia; the anal fimbria pale fulvous.

This species is also local. I have a specimen captured in the neighbourhood of London, but I do not remember the exact locality. I do not know its male.

Sp. 50. *ANDRENA PROXIMA*.

Melitta proxima, Kirby. *Melitta digitalis*, Kirby.

Female.—(Length $4\frac{1}{2}$ lines). Black; the face clothed with pale ochraceous pubescence; the antennæ longer than the head. Thorax

thinly clothed with very pale ochraceous pubescence ; a fringe of the same on the sides of the metathorax ; the tegulæ piceous ; the wings iridescent, sub-fuscous at their margins ; the floccus white ; the scopa of a pale golden yellow above, changing to silvery white beneath ; the basal joint of the posterior tarsi of a golden yellow within ; the apical joints of the tarsi ferruginous. Abdomen sub-ovate, convex, and very shining ; the margin of the second, third and fourth segments has a lateral white marginal fascia ; the anal fimbria golden yellow, having in some lights a silvery reflection.

Male.—(Length $3\frac{1}{2}$ lines). Black ; a little whitish pubescence on the face ; the antennæ nearly as long as the head and thorax. Thorax very thinly clothed with pale ochraceous pubescence, which is also the colour of the pubescence on the legs ; the apical joints of the tarsi ferruginous. Abdomen oblong-ovate, very smooth and shining ; on the margin of the second, third and fourth segments, laterally a little white pubescence, and at the extreme apex a little bright yellow.

Mr. Kirby's *M. digitalis* I consider to be a variety of the female of *A. proxima*. This species I never met with near London : I have taken both sexes in Hampshire : I believe it also occurs at Bexley Heath, and at Highgate, but not abundantly. I believe it is a very local insect. The sexes are now first united : they bear a close resemblance to each other : in Mr. Kirby's Monograph the male is described under the specific name of *Collinsonana*.

Sp. 51. *ANDRENA COITANA*.

Melitta Coitana, Kirby.

Female.—(Length $3\frac{1}{2}$ —4 lines). Black ; nearly naked, a few pale ochraceous hairs at the base of the antennæ, a little at the sides of the thorax, and a fringe of the same along the under margin of the scutellum, and at the sides of the metathorax ; the tegulæ testaceous ; the wings iridescent, hyaline, and slightly clouded at their margins ; the tarsi ferruginous ; the floccus white ; the scopa above fuscous, beneath silvery white. Abdomen very smooth and shining ; the margin of the second, third and fourth segments has a narrow white fringe, interrupted in the two first ; the anal fimbria fuscous.

Male.—(Length 3 — $3\frac{1}{2}$ lines). Black ; the clypeus white, having two black dots ; a small angular white macula on each side of the clypeus, reaching the margin of the eye. Thorax, a little thin pale ochraceous pubescence on the disk ; the tegulæ piceous ; the wings hyaline, iridescent, and slightly clouded at their margins ; the legs

have a white pubescence; the claws ferruginous. Abdomen ovate-lanceolate, very smooth and shining, and having a thin scattered white pubescence; the extreme apex ferruginous.

This is a scarce bee: the female is now first described. I have captured both sexes at Weybridge, and have also received the male from the Rev. Mr. Little, from Scotland. The male resembles the same sex of the *A. analis*, but the small angular patch of white on each side of the clypeus will at once separate them, exclusive of other differences.

Sp. 52. *ANDRENA ARGENTATA*, *Smith*.

Female.—(Length 4 lines). Head, the clypeus very minutely and delicately punctured, with a few scattered larger punctures intermixed; from the base of the antennæ to the occiput delicately longitudinally striated; the inner orbit of the eyes with a line of pale silvery hairs; antennæ black above, piceous beneath. Thorax thinly clothed above with pale fulvous hairs; all the legs clothed with silvery hairs, the floccus on the posterior pair silvery white; the tibiæ clothed with hairs of the same colour; all the tarsi pitchy red. Abdomen shining black; the margin of the second, third and fourth segments with a band of silvery hairs, the centre fuscous; the margins of the segments beneath have also a fringe of silvery hairs.

Male.—(Length 3 lines). Closely resembling the female, except that the thorax is altogether clothed with silvery hairs, and the abdomen has an additional band of silvery hairs, also a few silvery hairs on the lateral margins of the first segment. *Nomada Baccata* is parasitic upon this species.

Sp. 53. *ANDRENA ANALIS*, *Panzer*.

Female.—(Length 4 lines). Black; the face thinly clothed with white pubescence; the antennæ piceous beneath; the mandibles ferruginous at their tips. Thorax, the pubescence on the disk very sparing, nearly white; quite white on the sides, and at the sides of the metathorax; the tegulæ piceous; the wings iridescent, hyaline, and slightly clouded at their margins; the posterior tibiæ and tarsi, the intermediate tarsi, and apical joints of the anterior tarsi, ferruginous; the floccus white; the scopa yellow. Abdomen convex, shining, and having a little white fringe on the margins of the segments laterally, also a very thin scattered white pubescence, particularly at the sides; the apical fimbria fuscous.

Male.—(Length 3—3½ lines). Black; the clypeus white, with two black dots; its pubescence is white; along the inner margin of the eyes it is of a sooty black. Thorax, a little thin rather long pubescence at the sides, and on the metathorax; the disk shining and nearly naked; the wings iridescent, hyaline, and very slightly clouded at their margins; the intermediate and posterior tarsi, and the apical joints of the anterior, ferruginous. Abdomen convex, shining, and having a thin white fringe on the margins of the segments, frequently obliterated; the extreme apex pale ferruginous.

I have not met with this species in the neighbourhood of London: it occurs, however, at Weybridge. I have a specimen of the male taken in Ireland. It is abundant, Mr. J. Hardy informs me, at Penmanshiel Wood, Berwickshire. It forms its burrows in the banks skirting the pathways which run through the wood: at Weybridge I captured it in a similar situation.

Sp. 54. *ANDRENA LABIALIS*.

Melitta labialis, Kirby.

Female.—(Length 6 lines). Black; the face has a fulvous pubescence, the clypeus being nearly naked; the tips of the mandibles ferruginous. Thorax thinly clothed above with fulvous, more thickly so, but of a paler colour, at the sides, and on the metathorax laterally; the tegulæ pale testaceous; the wings clouded at their margins; a short fulvous pubescence on the legs; the tarsi ferruginous; the flocus very pale fulvous; the scopa fulvous. Abdomen ovate, rather depressed; the second, third and fourth segments have a narrow marginal fringe of pale fulvous hair, the two first generally interrupted; the apical fimbria fulvous.

Male.—(Length 5—5½ lines). Black; the clypeus, and an angular patch on each side, pale yellow; two black dots on the clypeus; the antennæ slightly piceous beneath. Thorax clothed above with short fulvous pubescence, much paler at the sides and beneath; the tegulæ pale testaceous; the wings slightly testaceous, clouded at their margins; the legs have a pale fulvous pubescence, but it is nearly white on the femora beneath; the tarsi ferruginous. Abdomen ovate-lanceolate; the segments have laterally a pale marginal fringe, frequently obliterated on the first segment; the extreme apex fulvous.

This species is not uncommon in the neighbourhood of London: it forms large colonies. I have taken it at Hampstead Heath, Highgate, Hawley, Hants, Weybridge, &c. Its pubescence soon fades,

specimens occurring in which it is quite white. This species appears about the end of May or the beginning of June. *Nomada rufiventris* is parasitic upon this bee.

Sp. 55. *ANDRENA SEPARATA*, *Smith*.

Female.—(Length 6 lines). Black; the clypeus yellow; the face clothed with fulvous pubescence; the antennæ nigro-piceous beneath. Thorax thinly clothed with fulvous on the disk; the tegulæ testaceous; wings sub-fuscous; the pubescence on the legs fulvous; the floccus pale fulvous; the scopa golden yellow; the tarsi pale ferruginous. Abdomen ovate, convex; the first, second and third segments have a pale fulvous marginal fringe, the first broadly interrupted; the apical segment clothed with fulvous pubescence.

This insect very closely resembles *A. labialis*, and had I only met with a single specimen or two I might have felt justified in considering it to be a variety, differing only in having the clypeus white, but I have seen a number of specimens. It is in the cabinets of Mr. Stephens, Mr. Desvignes, Mr. Dale, Mr. Walcott, and my own. It may indeed be only a variety, but I hesitate to consider it so. It is the only instance with which I am acquainted of the female sex having a white clypeus: my specimens were captured at Highgate. The male is not known.

Sp. 56. *ANDRENA KIRBII*, *Curtis*.

Female.—(Length 6 lines). Black; the head minutely and closely punctured; the face clothed with ochraceous pubescence; the antennæ piceous beneath. Thorax sparingly punctured, and thinly clothed with short pale ochraceous pubescence; the wings yellowish, clouded at their apical margins; the femora and tibiæ clothed with pale pubescence; tarsi ferruginous, the basal joint clothed with pale hair, changing with the light to ferruginous. Abdomen minutely punctured, pubescent, especially at the base, the margins of the segments being narrowly fringed with pale ochraceous hair, forming four transverse bands; the apical fimbria yellowish-brown.

The only specimen which I have seen of this fine species is in the cabinet of Mr. Stephens: there is an admirable figure of it in Mr. Curtis's *British Entomology*, p. 129. The male is not known. "The insect was formerly in the collection of the late Mr. Griffin of Norwich, and was probably captured in the neighbourhood of that city."

Sp. 57. ANDRENA LEWINELLA.

Melitta Lewinella, Kirby.

Male.—(Length $3\frac{3}{4}$ lines). Black; the antennæ nearly as long as the thorax; the face clothed with pale rufous pubescence. Thorax, the pubescence on the disk rufous; wings iridescent, sub-hyaline, slightly clouded at their apical margins; the legs fuscous; the apex of the posterior tibiæ and all the tarsi testaceous. Abdomen ovate-lanceolate, fuscous, and having a thin griseous pubescence; the second, third and fourth segments have laterally a narrow white marginal fringe.

There is that general resemblance between this species and the *A. picicornis*, that I think it may in all probability be its male. I have never met with either sex, and have only seen those in the Kirbayan cabinet: both species were captured by Mr. Kirby at Barham, in Suffolk, but were rare.

Sp. 58. ANDRENA COMBINATA.

Melitta combinata, Kirby. *Melitta nudiuscula*, Kirby?

Female.—(Length 4—5 lines). Black; the face clothed with thin pale rufous pubescence, that on the cheeks and vertex is nearly white. Thorax clothed on the disk with rufous pubescence; a thick incurved fringe on each side of the metathorax much paler in colour; tegulæ piceous; the wings iridescent, slightly clouded at their margins, the nervures testaceous; the posterior tarsi, and the apical joints of the anterior and intermediate pairs, rufous; the floccus white; the scopa fulvous. Abdomen sub-ovate, slightly depressed, finely punctured; the second, third and fourth segments have a narrow white marginal fringe, the first and second generally interrupted; beneath, the margins are ciliated with long white hairs.

Male.—(Length 4 lines). Black; the antennæ as long as the thorax; the face clothed with long pale pubescence, which is also the colour of that on the disk of the thorax; wings iridescent, slightly clouded at their apical margins; the apical joints of the tarsi piceous. Abdomen ovate-lanceolate, a little pale pubescence on the basal segment, and the margins slightly ciliated with pale hairs.

I cannot regard Mr. Kirby's *Melitta nudiuscula* as a good species, or as being distinct from the present. I consider it to be a specimen of the female, having the marginal bands obliterated. This insect is not uncommon in the London district.

Sp. 59. ANDRENA ALBICRUS.

Melitta albicrus, Kirby. *Melitta barbilabris*, Kirby, male.

Female.—(Length 5—5½ lines). Black; the mandibles rufescent at their apex; a little fulvous pubescence at the base of the antennæ; on each side of the clypeus, which is coarsely punctured, it is white. Thorax clothed above with fulvous; the wings sub-hyaline, very slightly clouded at their margins; the stigma nearly black; the floccus white; the scopa fuscous above, beneath it is silvery white; the tarsi ferruginous within; the claws ferruginous. Abdomen ovate, smooth and shining; the second, third and fourth segments have a white marginal fringe, the two first generally interrupted; beneath, the margins of the segments are narrowly testaceous, and have a narrow white fascia, and also a few long white hairs between the fasciæ.

Male.—(Length 4—5 lines). Black; the pubescence hoary, slightly tinged with yellow on the thorax; on the clypeus it is silvery white, and as it were combed down over the mouth; the wings are iridescent; the stigma nearly black. Abdomen ovate-lanceolate, the margins of the segments slightly piceous; beneath, the margins of the segments are ciliated with white hair.

This species appears about the middle of May. I have found colonies of it at Hampstead and Charlton, and have frequently taken pairs *in coitu*: at the former place I have observed *Nomada lateralis* entering its burrows: both sexes are remarkable for having the stigma much darker than is usual with these insects. Mr. Kirby's *M. barbilabris* I consider to be a variety of the male.

Sp. 60. ANDRENA CONNECTENS.

Melitta connectens, Kirby.

Female.—(Length 5 lines). Black; at the base of the antennæ a little long pale fulvous pubescence; the antennæ piceous beneath. Thorax slightly pubescent on the disk, the pubescence pale fulvous; rather paler on the sides and on each side of the metathorax; the tegulæ testaceous; the wings sub-fuscous and slightly clouded at their margins, the nervures testaceous; the legs nigro-piceous; the posterior tibiæ and all the tarsi rufo-testaceous; the floccus nearly white; the scopa of a golden yellow. Abdomen ovate, shining, and finely punctured, the margins of the segments slightly piceous.

Of this species there is only a portion of the specimen left in the Kirbayan cabinet. It is a species which I do not possess.

Sp. 61. ANDRENA MINUTULA.

Melitta minutula, Kirby.

Female.—Length 3—3½ lines). Black; a line of short silvery hair on the face, along the inner margin of the eyes; the antennæ rufo-piceous beneath. Thorax, a little hoary pubescence at the sides; the tegulæ piceous; the wings fuscous, palest at their apical margins, the nervures ferruginous; the floccus white; the scopa silvery white, not very dense, and changing in colour in different lights; the tarsi have fulvous pubescence within; the apical joints ferruginous. Abdomen sub-ovate, shining, nearly naked, having only a few white hairs on the margins of the apical segments; the anal fimbria fuscous.

Male.—(Length 2½—3 lines). Black; the face clothed with white pubescence; the antennæ rufo-piceous beneath. Thorax, the tegulæ piceous; the wings iridescent, sub-hyaline; the legs have a silvery-white pubescence; the claws ferruginous. Abdomen convex, smooth and shining, having a thin griseous pubescence.

Sp. 62. ANDRENA NANA.

Melitta nana, Kirby.

Female.—(Length 3½ lines). Black; a line of short silvery hair on the face, along the inner margin of the eyes. Thorax, the tegulæ piceous; the wings iridescent, sub-fuscous; legs with a hoary pubescence; the floccus white; the scopa silvery-white; the basal joint of the tarsi has a fulvous pubescence within; the claws ferruginous. Abdomen sub-ovate, rather broadest towards the apex, finely and closely punctured; the second, third and fourth segments have a white marginal fascia, broadly interrupted in the two first; the anal fimbria white, with a little fulvous pubescence at the extreme apex.

Male.—(Length 3 lines). Black; the face clothed with white pubescence; the antennæ nigro-piceous beneath; the tegulæ piceous; the wings splendidly iridescent, sub-hyaline; the disk has a little ochraceous pubescence as well as the legs; the claws ferruginous. Abdomen ovate-lanceolate, very finely punctured, and having a thin scattered ochraceous pubescence; apex piceous.

Sp. 63. ANDRENA PARVULA.

Melitta parvula, Kirby.

Female.—(Length 3—3½ lines). Black; a little pale pubescence on the clypeus, and a line of short pale fulvous hair along the inner

margin of the eyes. Thorax, a little pale fulvous pubescence on the disk; the wings splendidly iridescent, sub-fuscous, with their tegulæ piceous; the legs have a pale fulvous pubescence, which is also the colour of the scopa above, but it is silvery beneath, changing colour in different lights; the floccus white. Abdomen ovate, nearly naked; the apical fimbria pale fulvous.

Male.—(Length 3 lines). Black; the face clothed with black pubescence; the tegulæ piceous; the wings splendidly iridescent, sub-fuscous; the legs have a hoary pubescence; the claws ferruginous. Abdomen sub-ovate, nearly naked, the extreme apex piceous.

Mr. Kirby has remarked that *A. minutula*, *nana* and *parvula*, are liable to be confounded, although distinct species: the female of *minutula* has the underside of the antennæ more or less red towards the apex, its wings are brown, and its abdomen is impunctate: *A. nana* has the abdomen punctulate, and lateral marginal fascia: *A. parvula* has an ovate abdomen, and its antennæ are wholly black. The male of *A. parvula* is at once known by its black face: the male of *nana* has a longer abdomen and also longer antennæ than the male of *minutula*, and its wings are paler.

Sp. 64. ANDRENA SHAWELLA.

Melitta Shawella, Kirby.

Female.—(Length 4 lines). Black; the face nearly naked; a few pale hairs at the base of the antennæ; the clypeus coarsely punctured; the antennæ slightly piceous beneath. Thorax nearly naked; a few pale hairs at the sides of the metathorax; tegulæ nigro-piceous; the wings slightly fuscous; the legs nigro-piceous, their pubescence nearly white; the floccus white; the scopa fuscous above, silvery-white beneath; the posterior tarsi fulvous within; the apical joints of all the tarsi piceous. Abdomen oblong-ovate, shining, punctate; the margins of the second, third and fourth segments have a narrow white fascia, generally interrupted on the two first; the anal fimbria fuscous.

This is a scarce little bee. I have taken it in the autumn at Gravesend: I have also seen specimens captured at Southend in August. I do not know the male.

Sp. 65. ANDRENA PILOSULA.

Melitta pilosula, Kirby.

Male.—(Length $3\frac{3}{4}$ lines). Black; the face clothed with black

pubescence; the antennæ nearly as long as the head and thorax. Thorax thinly clothed on the disk with a little pale pubescence; the tegulæ piceous; wings sub-fuscous; the legs nigro-piceous, having a long pale pubescence; the posterior tarsi, and the apical joints of the intermediate and anterior tarsi, ferruginous; the basal joint of the tarsi fulvescent within. Abdomen oblong-ovate; the margins of the segments rufo-piceous, the apical segment piceous.

This male closely resembles the same sex of *A. Gwynana*, of which it may be a permanent variety; but as it differs from the usual characters of that male, I hesitate to consider it synonymous. It is found near London in the spring.

Sp. 66. *ANDRENA CONVEXIUSCULA*.

Melitta convexiuscula, Kirby.

Female.—(Length 5 lines). Black; the face clothed with pale fulvous pubescence; the antennæ nigro-piceous beneath. Thorax clothed with fulvous, rather thinly so on the disk, palest at the sides; the tegulæ piceous; the wings sub-hyaline, clouded at their apical margins; the clothing of the legs pale fulvous; the posterior tibiæ pale rufous, having a dark stain beneath; the posterior and intermediate tarsi, and the apical joints of the anterior pair, pale rufous; the floccus white; the scopa fulvous, in some lights having a silvery reflection. Abdomen fuscous, sub-ovate, very convex, smooth, shining, and very finely punctured, the two apical segments having a very short rufous pile; the second, third and fourth segments have a pale fulvous marginal fringe, the first generally, and the second sometimes, interrupted; the anal fimbria pale fulvous; beneath convex, the margins of the segments having a pale fringe.

Male.—(Length 4 lines). Black; the face has a clothing of white short pubescence; the antennæ as long as the head and thorax, the joints sub-arcuate. Thorax, the tegulæ nigro-piceous; the wings slightly fuscous, clouded at their apical margins; the posterior tibiæ, and the apical joints of the anterior and intermediate pairs, pale rufous. Abdomen fuscous, oblong-ovate, smooth, shining, and very finely punctured; the second, third and fourth segments have a very pale marginal fringe, the first interrupted; the apical segment has a little pale fulvous pubescence.

This species I never met with near London: I once took a specimen or two in Hampshire. Mr. Dale informs me that some seasons it is not uncommon at Glanville's Wootton. One peculiarity appears

to attend this species, namely, all the specimens are Stylopized : I have not yet seen a specimen of either sex which was not so infested. I mentioned the circumstance to Mr. Dale, and he informed me that such had been his own observation. I have two males, out of each of which a male Stylops has escaped. I have males of other species out of which the parasite has emerged ; and as yet I never captured a male bee containing a female Stylops. The male is now first described.

Sp. 67. ANDRENA XANTHURA.

Melitta xanthura, Kirby.

Female.—(Length 5—6 lines). Black ; the face clothed with very short pale pubescence ; the apex of the antennæ beneath piceous. Thorax clothed above with a short fulvous pubescence, palest at the sides of the metathorax ; the tegulæ rufo-piceous ; the wings slightly fuscous, clouded faintly at their apical margins ; the floccus nearly white or pale fulvous ; the scopa fulvous ; the posterior tibiæ and tarsi, the intermediate tarsi, and the apical joints of the anterior, rufo-testaceous. Abdomen oblong-ovate, slightly depressed ; the second, third and fourth segments have a white marginal fringe, the two first interrupted ; the apical fimbria fulvous ; beneath, the segments are ciliated with long fulvous hair.

Male.—(Length $3\frac{1}{2}$ —5 lines). Black ; the face clothed with a reddish-brown pubescence ; the antennæ nearly as long as the head and thorax ; the pubescence on the disk of the thorax is of a reddish-brown, palest at the sides ; the pubescence on the legs is of the same colour, but still paler ; the wings are iridescent, and slightly clouded at their margins. Abdomen ovate, convex ; the margins of the segments, excepting the basal, have a narrow pale marginal fringe ; beneath they are piceous, and are ciliated with pale hair ; the apex of the abdomen is fulvous. In fine specimens similar to the one described the basal segment is pubescent at the sides, and its margin has a slight lateral fringe.

The specimens described were captured *in coitu*, are highly coloured and recently developed : the pubescence of both sexes is frequently much paler, particularly that of the male, on which it is often found quite white : the male also varies considerably in size. I consider Mr. Kirby's *Melitta ovatula* and *M. contigua* to be varieties of the male. This is one of the most abundant species of the genus, and appears to be generally distributed. I have always observed it to

burrow in the level ground, particularly in sandy situations : I do not remember ever to have detected it burrowing in sloping banks, which many of the species of this genus usually prefer.

Sp. 68. *ANDRENA FUSCATA*.

Melitta fuscata, Kirby.

Female.—(Length $4\frac{1}{2}$ lines). Black ; the pubescence on the face fulvous, on the vertex it is fuscous ; the antennæ beneath slightly piceous. Thorax, on the disk the pubescence is fuscous, and fulvous on the sides and on the metathorax laterally ; the tegulæ nigro-piceous ; the wings hyaline, slightly clouded at their margins ; the legs beneath are nigro-piceous, their pubescence very pale fulvous, as is also the floccus ; the scopa fulvous ; the tarsi dark ferruginous. Abdomen sub-ovate, convex, shining, and finely punctured ; the margins have a pale or white marginal fringe, the anterior broadly, and the second generally, more or less interrupted.

Male.—(Length 4 lines). Black ; the face has a fulvous pubescence, that on the thorax is more inclining to pale fuscous ; the wings hyaline, iridescent, and slightly clouded at their apical margins ; the legs are clothed with a similar pubescence to that of the thorax ; the claws ferruginous. Abdomen oblong-ovate, shining and finely punctured ; the margins of the segments, excepting the first, have a pale or sometimes white fringe.

This species closely resembles the *A. Afzeliella*, but it differs in having black posterior tibiæ ; otherwise I can point out no distinguishing marked character. This bee is abundant near London, and appears to be generally distributed. I have seen specimens captured in Wales, Scotland, and the Isle of Wight. This species appears in May, and sometimes I have met with it in April.

Sp. 69. *ANDRENA AFZELIELLA*.

Melitta Afzeliella, Kirby.

Female.—Length $4\frac{1}{2}$ —5 lines). Black ; the clypeus nearly naked, a little pale fulvous pubescence on each side along the margin of the eyes ; the antennæ black. Thorax thinly clothed on the disk with pale fulvous pubescence ; the metathorax fringed on each side with pale fulvous ; the tegulæ nigro-piceous ; the wings sub-hyaline, the apical margins slightly clouded ; the pubescence on the legs is pale fulvous ; the posterior tibiæ and tarsi, the intermediate tarsi, and api-

cal joints of the anterior pair, rufo-fulvous. Abdomen sub-ovate, finely punctured; the second, third and fourth segments have a white marginal fascia, the first interrupted; the basal segment has sometimes a little fulvous pubescence at the sides, and a little white at its extreme lateral margin; the anal fimbria fuscous or slightly fulvous; beneath convex, and the margins of the apical segments are ciliated with rather long fulvous pubescence.

Male.—(Length 4 lines). Black; the face has a fulvous pubescence, with which the disk of the thorax is also clothed, but rather paler; the wings are hyaline, iridescent, and slightly clouded at their apical margins; the posterior tarsi, and the apical joints of the intermediate and anterior pairs, rufo-piceous. Abdomen oblong-ovate; the margins of the segments have laterally a narrow pale marginal fascia, the third and fourth sometimes entire.

The male of this species may be distinguished from that of *fuscata*, which it greatly resembles, by its having the basal joint of the posterior tarsi pale; in *fuscata* it is black. This species is very abundant, and found all over the country: it appears about the beginning of May.

Sp. 70. *ANDRENA EXIMIA*, *Smith*.

Male.—(Length 4—5 lines). Black; the face clothed with black pubescence; the clypeus coarsely punctured; the mandibles long, arcuate, and having an acute tooth at their base about a line in length; antennæ as long as the head and thorax, the joints arcuate. Thorax thinly clothed on the disk with pale fulvous pubescence, finely punctured, with large distinct punctures intermixed; the tegulæ black; the wings hyaline, the nervures testaceous, a slight cloud at their apical margins; the legs clothed with pale fulvous pubescence; the tarsi dark ferruginous. Abdomen oblong-ovate, the margins of the first and third, and the whole of the second segment red, having a longitudinal dark stain in the centre; the margins of the remaining segments piceous.

Two specimens of this insect were captured by Mr. Heales this season, I believe in April: I believe them to be unique in that gentleman's cabinet: they bear a very close resemblance to *A. Rosæ*, and might be supposed at first sight to be its male, but *A. Rosæ* is not found until the end of summer, about August: I captured it this year in that month, in company with the male which I have assigned to it. *A. eximia* also resembles the banded varieties of *A. spinigera*, but

in that species the posterior tarsi are long, slender and pale; in the present species they are short, stout and dark-coloured.

Although I possess several specimens of the present genus which I have not described, yet I think it very probable that further observation will prove some to belong to females described in the present papers, and I am unwilling to increase species unnecessarily. I shall probably find it necessary to describe a few more species in an appendix to my Descriptions of British Bees.

FREDERICK SMITH.

5, High Street, Newington,
October, 1847.

Note on the large Wood Ant.—On the 11th ult. I was walking along a Devonshire lane (these lanes seem more like inlets to the abodes of the blessed than aught else), and saw many young colonies of the *large* brown ant: I disturbed one, and, stooping down to smell more nearly the odour which they emit, felt something sprinkling my face like very minute rain: I desired my companion to approximate his person, in order to undergo the like aspersion, and he had no sooner done so than he bounded up like a startled Arab, yelling amain: portions of the ascending shower had entered his eyes, causing intense pain. I put down my hand, and could feel the cool particles sprinkling it all over. Then I let some of the ants crawl upon my stick; and as I watched them I was somewhat astonished to see them alter their position, by standing nearly upright, propping themselves up by their obese extremity and two hinder legs, thus bringing their sting to bear on the point, and then squirting out a clear liquid from their mouth to the distance of some six or eight inches: altogether they looked in a decidedly milling attitude. This liquid, as I suppose, is formic acid: it has a pungency, both as regards feeling and smell, perhaps superior to muriatic: I judge by the keenness with which it affected my nasal nerves. I take it this power of ejecting an offensive matter is given them by Nature as a defence: the skunk of America sends out a suffocating stench when attacked; and it is said that the fox, as a last resource, offends the eyes of the hounds by a disagreeable application. Mr. Waterton disallows that the weasel tribe have this faculty as a defence, and asks “at what old Granny’s fireside the information was picked up.” I fancy he must be a bold man, and girt with a panoply of Nature’s lore, who would call in question the opinion of that “amiable and enterprising naturalist,” as he has been aptly called. Although an ant and a weasel are different beings, yet they each have the power of emitting strong odours; which odours perhaps stand them in the room of weapons of defence to themselves (certainly of offence to other animals), without being offensive to their respective owners. A Sussex naturalist told me that he once nearly lost his breath by bending over a large nest which he had disturbed, the fume acting like carbonic acid. I have seen the nests entire in a wood near Edmonton, built of fir leaves, &c., and conical, rising three feet high on a base of about eighteen inches or two feet.—*Henry Daniell; Exeter, September 16, 1847.*

Postscript to Dr. Schaum's Revision of British Hydrocantharidæ.—Since my paper on the British Hydrocantharidæ went to press, my attention has been called to the description of a species by Mr. Babington, in the 'Annals and Magazine of Natural History;' and this affords me the opportunity of severely reprobating the practice of publishing, in the innumerable numbers of the very numerous periodical journals, isolated descriptions, which are thus certain to escape the notice of the monographer and systematic entomologist. Who would load his memory with such notices? The reader is requested to make the following additions to my paper (Zool. 1887).

Page 1888, line 23, *for ericetorum read subalpinus.*

„ line 24, *for cærulescens read cyanipennis.*

„ line 25, *for Wal. read Watlt.*

„ line 33, add the name of Mr. Waterhouse, of the British Museum.

GENUS AGABUS, *Leach, Erichs.*

Page 1894, after the sixth species, *A. affinis*, Payk., make the following addition.

6*. *A. striolatus*, Gyll., Aubé.

Col. rectus, Babington, Ann. and Mag. Nat. Hist. vi. 53.

I have compared specimens of the *Colymbetes rectus* of Babington, in the cabinets of Messrs. Stephens and Wollaston, and find it to agree perfectly with the elaborate descriptions of *A. striolatus* of Gyllenball and Dr. Aubé.—*H. Schaum; London, September, 1847.*

Notes on the British Species of Pselaphidæ. By H. SCHAU, M.D., Sec. Ent. Soc. of Stettin, &c.

Since the publication of Denny's treatise on the Pselaphidæ, in 1825, this group of small Coleoptera has been the object of careful researches of several distinguished entomologists. Dr. Aubé has published, at two different periods (1834 and 1844), monographs of it, the former in Guérin's 'Magazin de Zoologie,' the latter in the 'Annales de la Société Entomologique de France.' Erichson has described most precisely the genera and species occurring in the Mark Brandenburg; and lately Baron Chaudois has given an enumeration of the species found near Kiew, in Russia, in the 'Bulletin de la Société Impériale des Naturalistes de Moscou.' It may, therefore, not appear inopportune to submit the British species of this group to a short revision, in order to render the nomenclature of these authors concordant.

Of the six genera, Euplectus, Bythinus, Arcopagus, Tychus, Bryaxis and Pselaphus, established in this group by Dr. Leach, five are universally adopted, the sixth, Arcopagus, offering no characters of any importance, having been united with Bythinus by all the continental authors.

In Denny's monograph of the genus Euplectus eight species are described, viz., *E. Reichenbachii*, Denny, *sanguineus*, Denny, *Karstenii*, Reich., *signatus*, Reich., *Kirbii*, Denny, *pusillus*, Denny, *bicolor*, Denny, *brevicornis*, Denny. Of these, *E. brevicornis* has been made by Dr. Aubé the type of a separate genus, *Trimium*; *E. Reichenbachii* is the *Pselaphus nanus* previously described by Reichenbach, and *E. pusillus* is identical with *P. ambiguus* of the same author. *E. Kirbii*, regarded by Erichson and Aubé as not sufficiently distinct from *E. signatus*, had also been sunk; but on carefully examining the typical specimen of that species contained in the

British Museum, I found that it does not belong to *E. signatus*, but to the species described by Aubé under the name of *E. Fischeri*. Denny having overlooked its principal character, viz., the little fovea on the vertex, it is not surprising that *E. Kirbii* has been mistaken by those who had no opportunity of seeing the original specimen. To this list of *Euplectus* Mr. Stephens added in his 'Manual' a supposed new species, named by him *E. ruficornis*: I have examined it in Mr. Stephens's own cabinet, and cannot consider it different from *E. ambiguus*, *Reich.* (*pusillus*, *Denny*). *E. sanguineus*, *Denny*, is stated by Mr. Stephens to be *E. minutus*, *Marsh.*, but the specimen of the latter in Mr. Stephens's collection seems to me to belong to *E. signatus*. Another species of this genus is the *E. Easterbrookianus*, *Leach*, but the characters published by Dr. Leach being so short as not to enable any one to recognize this insect, and the typical specimen being lost, I think it should be erased from the list of British species. There remain seven species of *Euplectus* and one of *Trimium*. I have, however, found that the specimen in the British Museum, named by Dr. Leach *E. Kunzei*, and referred by Mr. Denny to *E. brevicornis*, is distinct from that species, and belongs to the *Trimium brevipenne* lately described by Baron Chaudoir, which differs from *T. brevicorne* in its yellow colour, and also in the figure of the elytra, which are shorter and notched at the apex.

Of the genus *Bythinus* Mr. Denny enumerates three, and of *Arcopagus* four, species, viz., *B. Curtisii*, *Denny*, *securiger*, *Reich.*, *Burrellii*, *Denny*, *A. bulbifer*, *Reich.*, *clavicornis*, *Panz.*, *puncticollis*, *Denny*, *glabricollis*, *Reich.* Of this number *A. glabricollis* is to be deducted, being only the female of *A. bulbifer*, and distinct from the true *glabricollis*, *Reich.*, which is the female of *clavicornis*. Mr. Stephens has added a supposed new species to the former genus, named by him *B. grandipalpus*, which, however, is nothing but the female of *B. Curtisii*.

Of the genus *Tychus* one representative only has been recorded as British. I have seen, however, in the collection of Mr. Wollaston, several specimens, taken in the south of England, which belong to *T. ibericus*, *Victor*, *Aubé* (*dichrous*, *Schmidt*), a species chiefly distinguished from *T. niger* by its red elytra and pale legs and antennæ, and which may perhaps be only a climatic variety of *niger*.

The genus *Bryaxis* is, according to Mr. Denny, represented in Great Britain by seven species, viz., *B. longicornis*, *Leach*, *sanguinea*, *Reich.*, *impressa*, *Panz.*, *fossulata*, *Reich.*, *hæmatica*, *Reich.*, *juncorum*, *Leach*, *nigriventris*, *Denny*. Of these *B. nigriventris* is identical with *Pselaphus venustus*, *Reich.*, and belongs to Dr. Aubé's genus *Batrisus*, sufficiently distinguished from *Bryaxis*, which has a single claw only on each tarsus, by having the tarsi terminated with two claws of unequal size. The above number of species is further to be reduced, as *B. longicornis* is only the male of *B. longicornis* [sic. Ed.] Mr. Curtis added two other species, viz., *B. assimilis*, *Curtis*, and *sulcicollis*, *Reich.* As to the former, which I know only by Mr. Curtis's careful description, I have little doubt it is the *Bryaxis hæmoptera* lately described by Dr. Aubé, of which species I have seen several British specimens, taken by Mr. Wollaston in the Isle of Portland. If it should prove to be so the name given by Mr. Curtis must stand. *B. sulcicollis*, beautifully figured by Mr. Curtis, is not the true *Pselaphus sulcicollis*, *Reich.* (*Euplectus sulcicollis*, *Erichs.*, *Aubé*), but a species very closely allied to it, which has lately been described by Dr. Aubé under the name of *Euplectus Maeskelii*. Baron Chaudoir first observed that *E. sulcicollis* differs generically both from *Euplectus* and *Bryaxis* in the structure of its claws, which are of very unequal size, still more so than in *Batrisus*, and proposed to form a new genus under the name

Trichonyx. Into this genus also *E. Maeskelii*, *Aubé* (*sulcicollis*, *Curtis*) enters. Mr. Stephens still refers to the genus *Bryaxis* the *Pselaphus insignis* of Reichenbach, which is, however, identical with *Tyrus mucronatus*, *Panz.*, *Aubé*, and not yet found in Great Britain. The specimen named *insignis* in Mr. Stephens's collection is not distinct from *juncorum*.

Of the four species of *Pselaphus* admitted by Denny, viz., *Heisei*, *Herbst*, *Herbstii*, *Reich.*, *dresdensis*, *Herbst*, *longicollis*, *Reich.*, two have been sunk by Erichson and Aubé as not being sufficiently distinct, *P. Herbstii* into *Heisei*, and *P. longicollis* into *dresdensis*.

Thus the number actually known of British *Pselaphidæ* amounts to twenty-seven, viz., *Pselaphus* two, *Bryaxis* six, *Trichonyx* one, *Batrissus* one, *Tychus* two, *Bythinus* six, *Euplectus* seven, and *Trimium* two species.

I take advantage of this opportunity to add a few observations on some species of *Scydmænus*, described as new by British entomologists. According to typical specimens which I have examined, *S. Wighamii*, *Denny*, is *angulatus*, *Kunze* (*impressus*, *Sahlb.*, *Gyll.*); *S. ruficornis*, *Denny*, is *denticornis*, *Kunze*, ♀; *S. Deunii*, *Steph.*, is *denticornis*, *Kunze*, ♂; *S. punctipennis*, *Steph.*, is *collaris*, *Kunze*.

H. SCHAUM.

October, 1847.

Notes on the Coleoptera of the South of Dorsetshire.

By T. VERNON WOLLASTON, Esq., B.A., F.L.S.

THAT local faunæ (and therefore approximations to them) are of the greatest benefit to science cannot be doubted for a moment, seeing that by means of them only it is that we are enabled to arrive at the more important results of general geographical distribution. No matter as to the size of the area, whether large or small, which we investigate, the result must of necessity be valuable. For when we reflect how important the fauna of England, or of any other country, is in determining the range of species over the surface of the earth, and when we also consider that the fauna of England is itself but a *local* fauna when compared with that of the world, we must at once be convinced that the same principle of importance attaches itself to areas of smaller magnitude than England, seeing that the very smallest of them combines with the rest in making up the general mass. On this account it is that I have always made it the principal object of my yearly excursions, not merely to collect specimens promiscuously, without reference to the localities from whence they came, but to keep accurate notes of all the species (whether retained or not) which I observed, together with the precise localities in which each occurred, in order that, on after examination, and when taken into consideration

with the geology of the different districts, something like broad results regarding their general distribution might, without difficulty, be arrived at.

In former volumes of the 'Zoologist' I have had the pleasure of recording some rough observations on the Coleoptera of the South of Ireland, of Lundy Island, and also of South Wales. I hope shortly to add to these North Wales and the Cotswold Hills; and in the meantime beg to offer a few remarks on the Coleoptera of the South of Dorsetshire, which, during the past May and June (thanks to the kindness of my friend, the Rev. Osmond Fisher of Dorchester), I have had excellent opportunities of investigating. I feel somewhat reluctant, however, in offering observations on the insects of a county which has been worked, through so many years, with such diligence and success, by my kind and valued friend J. C. Dale, Esq., of Glanville's Wootton. Nevertheless, as his district lies somewhat to the north of that which is the subject of the present treatise, and as remarks of this kind do not interfere with each other, but are more likely to corroborate what may have been previously advanced than oppose it, I feel considerably relieved, and less of a trespasser on forbidden ground.

To define, then, the boundaries of my area, I would merely remark that my field of action lies principally in the neighbourhood of Dorchester, and, stretching southwards, is "bounded" by the English Channel. The Isle of Portland, the far-famed Chesil Bank, and the neighbourhood of Weymouth, were my most productive localities on the *coast*, while obscure spots in the vicinity of Dorchester and Bridport produced me the greatest number of *inland* riches. I ought to state, however, that on arriving in the county my best collecting grounds were immediately pointed out to me by the Rev. Osmond Fisher, whose keen geological eye (though himself not an entomologist) at once distinguished the good localities from the bad, and whose accurate acquaintance with the whole country, in which he has been so long accustomed to pursue his favourite science, rendered his assistance to me, I need scarcely add, particularly valuable.

The weather being remarkably propitious, and my time entirely at my own disposal, I commenced my observations under the most favourable circumstances; and being especially anxious to explore the riches of the far-famed Chesil Bank (which I will take first into consideration), I soon found my way into the neighbourhood of Weymouth. It is, as most people are aware, a long ridge of pebbles, connecting the Isle of Portland with the mainland. For eight miles

it runs alongside, and is parallel to, the shore. Its length in all is about ten miles; but the collecting ground, which is somewhat less than one mile, is not properly a part of the bank itself, but a quantity of sand-hills attached to that point of its course where the back-waters (which fill up the space between it and the actual coast) find their exit, through a narrow mouth, into the open sea. These sand-hills form in fact one side of the *mouth* of this long and river-like gulph; and a wooden bridge, over which the high-road from Weymouth to Portland passes, connects them with the opposite land. The geography will be best understood by referring to a map. On these sand-hills have been captured all the rarities which are recorded as inhabiting the "Chesil Bank." Commencing at the mouth of the back-water above described, they run for nearly a mile in the direction of Portland, alongside and attached to the bank itself. The chief collecting is from beneath the stones, where an immense variety of rare species may be obtained. But I had also excellent sport in examining minutely many of the small plants which grow, interspersed with the coarse grass, amongst the sand, almost each of which seemed to produce something or other peculiar to itself.

On a dwarf species of *Erodium* I had here the satisfaction of discovering a very beautiful little *Curculio*, which, through the kindness of my friend Mr. Walton, I have since ascertained to be an entirely new species to the British fauna,—the *Phytonomus mixtus* of Schönherr. The mode of procuring them was very fatiguing. Attaching themselves generally to the under-sides of the leaves, directly the plant was moved they fell to the ground, and were buried in the sand below, from whence they could be alone obtained by examining it carefully in very small quantities at a time. I captured in all between thirty and forty specimens, but only on the species of *Erodium* above referred to.

More difficult still to descry, from its peculiar habitat and exact resemblance in colour to the sand, was a very large and beautiful species of *Tychius*, which I have not yet been able to determine (but apparently allied to *flavicollis*), and which I found adhering closely to the lower part of the stems of a small species of grass. So firmly do they cling, that it is not easy to disturb them from their hold; and when they *do* fall, which sometimes they may be made to do by brushing the grass suddenly with a stick, it is most difficult to detect them.

Crawling in the same localities, the minute *Micronyx Jungermannii* may be sparingly picked up; and on two occasions I found it by

searching closely into the sandy hollows, where it doubtless had been drifted by the wind, and was endeavouring, though to no purpose, to scale the sides. That very local and interesting insect, *Omophlus Armeriæ*, was here in abundance; though "on the flower of the thrift," which is said to be its peculiar habitat, I could not find a single specimen, although that plant was in great profusion and in full flower at the time. I usually found them crawling rapidly over the grass, and, in many instances, congregated beneath the stones, where, however, they must only have been taking shelter from the heat of the sun, and could not under such circumstances have been in their legitimate position. In one single afternoon I captured about sixty specimens.

But the most interesting ground is yet to be described. When the tide is out there is a large sandy flat, close to the bridge (above recorded as passing over the mouth of the long gulph or back-water), and joining on to the commencement of the sand-hills we have been just discussing. Whilst observing the beautiful undulations in the sand, caused by the action of the water as it receded over its surface, I beheld almost an innumerable quantity of minute holes or perforations scattered in every direction around me. This led me to investigate their meaning, and, on gently opening one of them with a pen-knife, I discovered a specimen of *Cillenum laterale* at the distance of about a quarter of an inch below. The sun then began to shine, and in less than a minute I beheld a scene which it will not be easy to forget. I had been accustomed to look upon *Cillenum laterale* as one of our rarest maritime insects, and had never seen it in a living state before: but here, in almost an instant, as it were by magic, I found myself surrounded by an innumerable multitude of them, running rapidly over the sand, from hole to hole, in every conceivable direction. In my ecstasy at such a sight, and in my flurry to secure as many as possible, I grabbed at five or six of them at once, and of course, as a recompense for my avarice, was some time before I could secure even *one*! At length, however, becoming cooler, I learned to catch them more scientifically, and in a very few minutes I had above one hundred specimens in my bottle, which began to satisfy me, and I passed on. But I had not proceeded many yards before something else, glistening even brighter still, caught my attention. This I instantly recognized as my old friend *Dyschirius thoracicus*, and therefore I was immediately on the *qui vive* for his comrade *Hesperophilus*, who, as usual, did not deceive me, for verily I never beheld an insect in greater profusion in my life: in some parts the sand was literally alive with

them. If *Cillenum laterale* occurred (as it did) by thousands, surely *Hesperophilus arenarius* existed by *tens* of thousands! Towards the evening they were the most abundant, but in such profusion did they inhabit the sand that at all times some at least of them appeared on the alert. It gave me the greatest satisfaction to observe the mixture of *Dyschirii* and *Hesperophili* on a scale so gigantic, because it bore the most substantial and incontrovertible evidence to opinions which I had before expressed in the 'Zoologist,' when discussing the habits of the *Dyschirii*. Nor was *Hesperophilus* the only companion of that group with *Dyschirius*, for in the same locality I discovered, though in less profusion, the beautiful and conspicuous *Bledius armatus*. And I may here mention that, in company with *thoracicus*, I took a single specimen of *Dyschirius salinus*, a species which was not before recorded as British, though taken sparingly for some years past by Mr. Haliday in the north of Ireland, and common enough, I am told by Dr. Schaum, in salt places throughout Germany and Prussia. But, since time and space fail me, let us leave now for a moment the sandy flats, on which the tide has allowed us so leisurely to roam, and return in haste to the adjoining sand-hills, where we left *Omphalus Armeriæ* asleep beneath the stones.

It is difficult to find language sufficiently strong to express the riches of this entomological "oasis," where, surrounded as if by a "desert" of bleak and shifting pebbles, everything that is rare and interesting seems to be congregated in a living mass. Like other places, it unquestionably is not equally productive at all periods of the year, for it has been whispered to me by a friend of no mean reputation, that times have been, and experienced by him, when the Chesil Bank was as barren and unprolific as the pebbles which surround it. But I am now speaking of the height of the season, which, in sandy districts on the coast, I conceive to be about the latter end of May,—the exact period of the year during which I had the good fortune to be there. I repeat, therefore, that I am only vouching for the proper season, and for my own captures during that particular season. Were I asked to recount what I had met with, I could produce a list long enough to do justice to any locality in the country, and certainly of sufficient extent to weary the readers of the 'Zoologist,' as they waded through its dry details. I shall therefore content myself by recording only a very few of the more interesting species which I observed, selecting particularly those which are most characteristic of the locality I am describing. Thus, for instance, I will

notice the following, which, with one or two exceptions, occurred in tolerable abundance, and some in the greatest profusion, for the most part beneath the stones.

<i>Dromius fasciatus</i>	<i>Aphodius hæmorrhoidalis</i>
<i>Licinus Silphoides</i>	<i>Cardiophorus Equiseti</i>
<i>Calathus fuscus</i>	<i>Necrobia ruficollis</i>
<i>Pogonus chalceus</i>	<i>Mecinus circulator</i>
<i>Brosicus cephalotes</i>	<i>Hypera dissimilis</i>
<i>Curtonotus convexusculus</i>	—— <i>variabilis</i>
<i>Harpalus serripes</i>	—— <i>Plantaginis</i>
—— <i>melancholicus</i>	<i>Phytonomus mixtus</i>
—— <i>anxius</i>	<i>Micronyx Jungermannii</i>
—— <i>neglectus (Dej.)</i>	<i>Otiorhynchus rugifrons</i>
<i>Actephilus vernalis</i>	<i>Sitona fusca</i>
<i>Ophonus pubescens</i>	<i>Coccinella 11-punctata</i>
<i>Masoreus luxatus</i>	<i>Crypticus quisquilius</i>
<i>Dermestes tessellatus</i>	<i>Phaleria cadaverina</i>
<i>Simplocaria semistriata</i>	<i>Omophlus Armeriæ</i>
<i>Saprinus æneus</i>	<i>Anthicus fenestratus ? (Dej.)</i>

Leaving this rich locality, and proceeding over the bridge towards Weymouth, we find ourselves on another sandy flat, called the Small-mouth Sands, and forming the opposite side of the mouth of the narrow gulph we have before alluded to. These sands are in continuity with the beach along which we have to pass, and may in fact be looked upon as forming part of the beach itself, which at low water is left dry to rather a greater extent than usual. From this point to the ruins of Sandfoot Castle, where our road leaves the shore, a rich field is before us; though, singularly enough, scarcely any of the rare insects which occur on the Chesil Bank are found here. With the exception of *Phaleria cadaverina*, a single specimen of which occurred here, I can recall but three species which I observed as common to the two localities, viz., *Cardiophorus Equiseti*, *Philan gibbus*, and *Dyschirius thoracicus*: everything else was totally distinct. *Argutor longicollis* was in the utmost profusion, but not a specimen on the other side of the bridge; also *Cleonus sulcirostris*, *Ægialia globosa*, *Opatrum sabulosum*, *Otiorhynchus atro-apterus*, &c.; whereas of such species as *Harpalus serripes*, *anxius* and *neglectus*, *Cillenum laterale*, *Omophlus Armeriæ*, *Otiorhynchus rugifrons*, and the little black *Anthicus*, which were in the greatest abundance on the sands adjoining the Chesil Bank, not so much as an example was to be seen.

But as space fails me, and having now noticed the most remarkable Coleoptera of this immediate district, I will quit these sandy flats with

reluctance, and, changing my position, dwell no longer on their riches. May I therefore request my readers to accompany me a few miles inland, and take up their position in the old Roman amphitheatre which overlooks the ancient town of Dorchester? If, standing on the sides of this venerable mound, they turn their backs on Dorchester, and gaze to the south-east, their eye will rest on what they believe to be a secluded valley, shut in between two chalk-hills of considerable height. Its position is at once defined by a quantity of large trees, the tops alone of which are seen, but which are sufficiently apparent, amidst the bleak little hills which surround them, to point out its existence. This valley, which forms part of an old manor called Herringstone, was the chief scene of my entomological researches in this neighbourhood. It is one of those remarkable positions, so common in the chalk formations, which produce what in Dorsetshire have obtained the name of "Winterbourns," *i. e.* streams which flow during the winter and spring only,—no vestige being left of them in the summer, except an unusual degree of luxuriance and rankness of vegetation. Well aware of its peculiarity, this was the very first position fixed upon by the Rev. Osmond Fisher, who conducted me to it immediately upon my arrival, as the most promising locality in the vicinity of Dorchester. Thus, having explained the position, which when the locality is a remote one I think it more particularly necessary to do, I will subjoin a short list (selected from a very long one) of some of the more interesting species which this valley produced, and then make a few observations on one or two contained in it.

Dyschirius gibbus
 Chlænus nigricornis
 ——— vestitus
 Agonum viduum
 ——— emarginatum
 ——— picipes
 Omaseus anthracinus
 Oodes Helopoides
 Lophæ pæcila
 Elaphrus cupreus
 Colymbetes fontinalis
 ——— uliginosus
 Oethebius pygmæus
 Parus prolefericornis
 Cyclonotum orbiculare
 Micropeplus porcatus
 Syncalypta arenaria
 Byrrhus sericeus

Gymnaëtron Beccabungæ
 ——— Veronicæ
 ——— niger (*Germet.*)
 Cleopus pulchellus
 Nedyus floralis
 ——— melanarius
 Poophagus Sysimbrii
 Rhinonchus brachoides
 Phytobius 4-tuberculatus
 Hydronomus Alismatis
 Hypera Pollux
 Tanisphirus Lemnæ
 Callidium Alni
 Thyamis lutescens
 Haltica antennata
 ——— 4-guttata
 Philonthus rubripennis.

Of these, the rare *Gymnaëtron Beccabungæ*, which I had never before taken, was in great profusion, and was found in company with *Poophagus Sisymbrii* and *Nedys floralis*. *Gymnaëtron niger* (*Germar*) was also abundant; but of the very rare and interesting *Gymnaëtron Veronicæ* I could obtain but a single pair, though I worked the locality to the utmost. For my own part I confess I should have doubted its being really distinct from *niger*, for red dashes on the elytra seem naturally peculiar, more or less, to the whole genus; and I should therefore have suspected, had occasional aberrations from a *black* type existed (which is not unlikely), that those aberrations would probably assume a form which is so common in the other species of the generic group. However, on the authority of such eminent entomologists as Dr. *Germar* and Mr. *Walton*, I rest satisfied. Of the minute and remarkable *Syncalypta arenaria* I also obtained but a single pair. Unlike most of the *Byrrhidæ*, they run with great celerity when aroused, though, in common with the rest of the group, they counterfeit death for an enormous length of time when caught; under these circumstances, with their legs tightly engrooved beneath, they can scarcely be distinguished, at first sight, from small seeds or globose particles of dirt. Of the very rare *Colymbetes fontinalis*, which was pointed out to me by Dr. *Schaum*, I captured but one specimen. It is distinguished from its congeners by a very remarkable and distinct tooth in the inner curvature of the front claw,—a character which was first detected by Dr. *Schaum* himself, and to whose kindness I am indebted for the information.

But, leaving *Herringstone*, which, as I before intimated, was my best inland locality, I will give merely a hasty glance at my captures in other directions. The water-meadows in the neighbourhood of *Dorchester* produce, apparently, only the ordinary insects which are peculiar to such situations. Hosts of the common *Donaciæ* and *Galerucæ*, abundance of *Atomariæ* (chiefly *dimidiata*), oceans of *Ephistermi*, vast quantities of *Hypolithus riparius*, *Poophagus Sisymbrii*, *Eirrhinus Nereis*, *Hypera Pollux* and *Rumicis*, and the black *Agonum emarginatum* of *Gyllenhal*, forming the most prominent part of the coleopterous inhabitants, next to such species as would be certain to occur by tens of thousands in every locality of that description.

Towards *Bridport* I had tolerable success, but chiefly in a small and romantic valley in the parish of *Powerstock*. On the edges of the stream which winds through this very beautiful retreat, *Peryphus cæruleus* (*Dej.*) may be taken in great profusion,—an insect exceedingly common throughout *Devonshire* and the mountainous district of

Wales. In the same situation a pair of *Parnus auriculatus* were picked up by the Rev. Osmond Fisher, who has also for many years past been accustomed to take a profusion of *Copris lunaris*, by digging them from their burrows in the adjoining fields. In the waters of the stream and the adjacent pools many of the *Hydropori* occur, particularly *12-punctatus*, *xanthopus* and *ovatus*: also *Haliphus elevatus*, *Colymbetes guttatus*, and *Elmis Volkmar*, but more sparingly. On the coast, not far from Bridport harbour, there is a little bay, where the river Freshwater falls into the sea. I there captured the very rare and local *Dromius quadrillum*; also a large colony of the Hemipterous insect *Tingis capitata*; but, with these exceptions, most of the species were of common occurrence. The same might be said of the coast on the *other* side of Portland, which, being for the most part high and rocky, is but ill calculated to produce any great variety of species, far less to rival the riches which abound so profusely on the sandy flats. Still a few good things may be taken at the sides of the small streams which trickle down the cliffs and bring with them a certain amount of soil, which they deposit as they go. In such situations, at Osmington, I captured the local and interesting *Tachys minutissimus*, where hosts of *Lopha 4-guttata* and the common *Peryphi* may be observed, with occasional specimens of *Cicindela campestris* glancing rapidly over the slopes.

Before, however, I close my remarks, I must be allowed to add one word on the Coleoptera of the Isle of Portland itself. The Chesil Beach below, and the adjacent flats, we have already discussed. But here we are far above them, on a high rocky island, which may be more aptly compared to an enormous stone-quarry than to anything else. Though in the immediate vicinity of a district so prolific, entomologically speaking it is but a poor locality. Bleak rocks and a shallow soil seldom produce much, albeit a *few* things may perchance occur sufficient to repay a slight investigation; and this was precisely the case here. Though I had not very favourable opportunities of exploring the island, still I *did* work it sufficiently to satisfy myself that by far the greatest portion of its Coleoptera were of the very commonest description. *Brachinus crepitans*, *Ophonus obscurus*, and the common *Harpali*, teemed beneath the stones, while hosts of *Malachii* might be observed in the sunshine, crawling to and fro upon the stone walls. At the extreme point of the island, called Portland Bill, a very large and elongate variety of the common *Agriotes sputator* occurs beneath the stones; and in the same position, in company with a species of ant, I had the good fortune to capture several speci-

mens of a new *Bryaxis* to the British fauna,—the *Bryaxis hæmoptera* of Aubé. It is a very interesting and beautiful little species, somewhat allied at first sight to *hæmatica*, though, on examination, totally distinct, and belonging to the division of Aubé's arrangement where the middle fovea of the thorax is as large as the lateral ones.

But I will now conclude my observations on the Coleoptera of this remarkable district, though, were space at my disposal, I could go on to enumerate many species both of rarity and interest, such as *Hydroporus confluens* and *memnonius*, *Meligethes Dulcamaræ*, *Ptinus imperialis*, *Gymnaëtron Graminis*, *Phyllobius viridicollis*, *Apion vernale* and *ebeninum*, *Chrysomela distinguenda*, *Cafius Fucicola*, &c., which occurred for the most part singly and in localities widely separated from each other. I might indeed recount a series of captures, containing amongst them *Eubria palustris*, *Aphanisticus pusillus*, *Anthonomus pomorum*, *Oxystoma Genistæ*, *Mylæchus brunneus*, *Cassida Vibex* and *sanguinolenta*, *Thyamis Holsatica*, &c., made during a visit to my friend J. C. Dale, Esq., of Glanville's Wootton,—but I will make no remarks upon them, first, because that district has been sufficiently well explored already by Mr. Dale himself, and secondly, because Glanville's Wootton is in the north of the county, whereas this paper professes to be an account of the Coleoptera only of the *south*.

I can only add, that if this communication be deemed of sufficient interest to induce entomologists to visit next year the district of which it treats, or if it be of any service to them whatever in pointing out, while there, the exact habitats of those species which I have enumerated, my object will be fully answered, and I shall consider myself repaid.

T. V. WOLLASTON.

Jesus College, Cambridge,
September 1, 1847.

An Essay on Classification. By H. N. TURNER, Jun., Esq.

THE science of Natural History is by many considered to be one of pure observation, and by some perhaps not a little undervalued on that account, as being less calculated to call forth the higher powers of intellect than other branches of knowledge comparatively more abstract in their nature. It must be admitted that Natural History, as pursued by a very considerable majority of its votaries, does consist

almost exclusively of the record of facts ; but such is, and must be, the groundwork of all those branches of study that lead us to a knowledge of the laws by which the material world is, and has been, regulated, from a beginning which we cannot yet conceive.

Our mental existence is so closely dependant on our physical sensibilities, that it is only through the special contrivances which the body affords that we can possibly become acquainted with the nature and properties of things around us ; the effects made apparent to our senses must then, it is obvious, be the source from which all ideas proceed, and it is in them alone that we can expect to find that alphabet, in which, by the exercise of our intellectual powers, we read the causes, from the most immediate to the most remote, and deduce, from the earliest periods of which we can obtain a knowledge, the course of operations whereby the present state of what we see is brought about.

Perhaps it is our duty still further to admit, that, in this progress from facts to generalizations and laws, Natural History is far from being foremost among the sciences : the objects of which it treats are so numerous, and the circumstances respecting each are so many, that long must be the series of observations, and great must be the labour and judgment bestowed in their arrangement, before any satisfactory conclusions can be reached. And it is but in times comparatively modern that this branch of knowledge can be said to have risen to sufficient rank to be looked upon as a science at all : its cultivators among the ancients were few ; the facts they collected were loose, and often mixed with fable ; the general contempt in which the observation of Nature was at that time esteemed retarded its steps, so that no generalizations could be effected. As knowledge, however, began to increase, it was found that Nature could only be rightly understood by careful and unwearied observation of effects, that the inductive process must precede the deductive, and, therefore, it was necessary to descend awhile from those heights of purely abstract science, which the pride of the ancient schools considered as alone worthy to be attained by man. Facts then began to accumulate, and the examination of Nature's forms showed them so abundant and so various that it defied the power of unassisted memory to retain them ; a sufficient number of names could not be found to designate them ; and the want of terms extensive, and at the same time sufficiently definite, in their application, rendered the enunciation of general propositions difficult.

It is not surprising that the different degrees of resemblance existing among the forms of organized beings were then made use of, to

group them into larger and subordinate divisions, each recognizable by some character possessed in common by the species included, to which a name could be applied, expressing at once a large number of different forms, and rendering the maze into which the naturalist was led a little less intricate. The science continuing to advance, having received fresh impetus from the introduction of this useful help, the imperfections of the system adopted were soon perceived, while at the same time the facilities which Nature gave for the arrangement of her forms maintained the universal opinion that she had a classification of her own, and to discover it was a goal, the attainment of which was by many considered as constituting the entire philosophy of the science. One set of naturalists, at a time not long gone by, and including some of the most eminent of their day, firmly believed it was attained; and as confidently maintained that Nature's arrangement was circular, as it had formerly been considered to be linear, even specifying the number of forms, or groups of forms, requisite to make a circle complete, and holding out that all that remained to be discovered was the links that still were wanting, yet must either exist, or have existed at some period since the commencement of organic life upon our globe. In short, had this enchanting dream of a discovery at all savoured of reality, the whole science of Natural History would have been very comparable to some of those well-established principles in Natural Philosophy, the effects of whose operation may always be predicted, in cases which neither observation nor experiment has ever yet realized before our senses. There lay in the foundation of this theory some very erroneous presumptions, the crumbling away of which was quite sufficient in itself to make the superstructure fall to the ground: it was contended that the species was the only adopted division not existing in Nature; that the higher divisions were perfectly natural; and that the rule for ascertaining them was, their completing the required number of which each circle should consist, and the correspondence of each group in its own circle with one forming part of every other throughout the series. Easy indeed is the task, amidst the innumerable degrees and shades of difference which creatures of complex organization may present, to select such characters as, by including a greater or less number of species in each group, shall bring the number of groups to any standard, such as binary, ternary, quinary, or whatever our fancy may suggest, and to hunt out some little peculiarity by which each division may be associated with another in a different circle.

Indeed the erroneous nature of many of the "affinities" supposed,

and the puerile observations in some cases brought forward to establish the "analogies," seem almost enough, in the present state of science, to discountenance the whole idea. But the species, so far from being the only division which Nature does not warrant, is in fact that of all others whose limits are most clearly marked: we see, in very many cases, class united to class, order to order, family to family, genus to genus, by links of union, while no species, whatever its range of variation, even though its varieties appear more different from each other than do two other distinct species, has been ever seen to blend into another species; and although the law of sterile hybrids has been shown to be not without exception, the difficulty of obtaining crosses between species truly different, and their usual incapability of further propagation, renders it most highly probable that Nature has placed a limit of her own, though she may occasionally allow it to be overstepped. Another absurdity, which it now seems almost waste of words to endeavour to refute, was the notion entertained that Comparative Anatomy, a science which the labours of Hunter and of Cuvier had just raised to great importance, had no connexion with Natural History, and did not in any way concern classification, the external peculiarities being quite sufficient in themselves to make out the whole details of the so-called "natural system." It may perhaps be here sufficient to observe, that so long as the observations of the naturalist are confined exclusively to the external appearances presented by the object before him, however useful they may be as forming part of the series necessary to be made, from their manifest incompleteness, referring only to a very small portion of the subject to which they relate, can never give rise to generalizations of sufficient value to constitute anything worthy to be called a science. It is true that, when a natural affinity is once established, there will in many instances be connected with it certain external peculiarities by which it may be recognized, but such is by no means universally the case; and the erroneous nature of many of the supposed affinities indicated in older classifications, which depended on the external peculiarities alone, together with the disagreement between the different systems adopted, shows abundantly that the characters on which they rested were arbitrarily chosen, and therefore could not be safely depended on. I hope that, in making these remarks, I may not be supposed in any degree to undervalue the exertions of many a talented and industrious pursuer of Natural History, who may not happen to have made the anatomy of the creatures on which his observations have been made a portion of his study; but should such a one

attempt to classify, it should merely be a temporary arrangement, made to answer some immediate purpose he may have in view.

To revert, however, to the subject of the circular and quinary system, it is impossible not to admire the very great ingenuity of the arguments by which it was supported; but even these, unless it had possessed *some* foundation in reality, could not have obtained for it the very extensive adoption that it was its lot to meet. Nature, although her lines of separation are seldom clearly marked, certainly does show types of organization in that unity of plan which characterizes her works throughout, and also subordinate types, the species included in these showing a still closer kind of affinity, in some cases so distinctly marked that we doubt not for an instant where to fix their limits; while in the frequent cases of adaptation to the same functions of species, or even groups of species, which have less real affinity with each other than some of them may have with others fitted for different purposes, "analogies" are by no means imaginary. It is, however, not only far from being always the case that the limits of the natural groups are clearly marked, but, so far from Nature pointing out any particular number of subordinate groups necessary to constitute one of the next degree, the limits of the various degrees of affinity are themselves of our own establishing. We apply the terms, class, order, family, &c., to indicate degrees of affinity closer or more remote; but the instances are few where Nature has so fixed the amount of difference that we can no longer doubt as to how much is necessary to constitute a distinct class, still less an order; indeed the more we descend into the details, the more difficult it is to draw the lines. Naturalists are by no means agreed as to what should be the limits of a genus: this name has been daily made more and more restricted in its application since the time when classification had its origin, many naturalists even constituting genera on distinctions so minute and trifling, that, so far from aiding the progress of the science, they are but an increasing burden on the memory. Again, how difficult it is to settle what amount of difference is too little, or what too much, to constitute a family; and even where it has by general consent been fixed, it sometimes happens, where the families are numerous, and do not form among themselves groups which differ widely enough to rank as orders, that they must be arranged in groups of intermediate value, to which the name "tribes" has generally been applied. Sub-classes, sub-orders, sub-families, sub-genera, are all among the attempts made to accommodate Nature to the definitive order of our own divisions.

Perhaps the mention of a few easily recognizable instances may

make the meaning intended to be conveyed more clearly understood. The class of birds are united among themselves by a similarity both of internal organization and external form, far greater than exists among the members of any other of the classes with which they are grouped under the vertebrate division, yet no one would deem them constituting a single order: to call them a sub-class would imply their ranking under some other class, and this the very great distinction they present from any other for ever must forbid. A bird is always known to be a bird, notwithstanding the almost endless variety the class presents; but among Mammalia, the vulgar look upon the bat as the link of bird and beast, mistake Cetacea for fishes, and the Manis was at one time called a "scaly lizard;" while in regard to the two remaining classes, it is even now a matter of dispute among men profoundly learned, whether the *Lepidosiren* is a reptile or a fish. To pursue the illustration from the class of birds, the orders into which it is divided do not show anything approaching to the amount of difference from each other that is seen in other classes, and many of the families, as usually adopted, differ scarcely more among themselves than do genera, as elsewhere formed. In any class, some of the orders are much more difficult to distinguish and to isolate than others; the same may be said of the families in any order; in Mammalia, for example, no one wishes to remove any of those species of which the order Rodentia is formed, or to add to it any of the species hitherto placed in other orders; therefore the distinctions which separate this order from the rest, and the ties which unite its members among themselves, must certainly be stronger than those of any other in the class; but, on the contrary, naturalists are by no means agreed as to whether man should form a distinct order of himself, or condescend to be associated with those creatures which sometimes seem as made to caricature his looks and actions; whether the Insectivora should, or not, be included among the Carnivora, or whether the bats should rank with them, or the human species should receive some compensation for his union with the apes, by the association in the same order of creatures that can soar into the subtle air; and by the quinary system, in which it was not unfrequently the case that four out of the five divisions in a circle were in tolerable accordance with Nature, while the fifth was a kind of refuge for all such destitute groups as neither of the others would admit, the Ruminants, originally made distinct, being united in one order with the Pachydermata and Edentata; these have since all been separated, and the question was but very lately mooted,—should the coalition between the two former

again take place. An interesting and remarkable example is also afforded by the marsupial series, a group united among themselves by constant and well-marked peculiarities of organization, but presenting differences much greater than are usually seen between members of one order, but yet not sufficient to warrant the application of that term as generally used to any of its subdivisions, and its close alliance with the other Mammalia forbids its ranking as a class. It is not the object of this essay to clear up any of the doubtful points just mentioned; but if the reader fully comprehends the meaning of the proposition, that, granting affinities and even groups to be natural, the limits assigned to those degrees of difference and similarity which we are wont to indicate by definite terms are not, and sees in these examples the slightest reason for assenting to its truth, the purpose for which they are brought forward is fulfilled.

That affinities really do exist in nature, it seems scarcely probable that any one acquainted with the leading facts and generalizations of Natural History would deny, although differences of opinion may exist as to their extent; indeed, were it not so,—that is, were it impossible to classify otherwise than by characters chosen in a purely arbitrary manner,—we could not expect to find even that amount of agreement which actually exists among the almost countless number of systems that have from time to time been offered for adoption. It might on first consideration seem easy, by classing together such species as present the greatest amount of resemblance, to arrange the whole series according to their natural affinities, and, by mentioning the points of resemblance, to characterize the different groups thus formed; but this, as every naturalist is aware, is a task of no inconsiderable difficulty, for among the great number of points of resemblance and of distinction to be taken into consideration, a species may be found to resemble, in different respects, a great many others, and those differing considerably among themselves. It is not, then, by the seizing of every character which the eye can perceive, that the natural affinities are to be ascertained, since by that means the student is only led into labyrinths more intricate as he advances in his researches: on the other hand, a system founded on the peculiarities of one set of organs alone, must, from its manifest incompleteness, be arbitrary, and can only serve as a kind of index of reference, or as an assistance to the memory. It is obvious, then, that neither of these methods of classification can ever bring us to a knowledge of the natural affinities, or to an appreciation of the characters by which they may be ascertained: we must, therefore, have recourse to the study

of some higher laws, from which we may deduce rules for our guidance in the selection of the characters on which our system should be founded.

On the survey of Nature's works, man has throughout been struck with the wondrous and beautiful series of contrivances and adaptations of means to the ends destined to be brought about; and with reference to organized bodies, not only in the structure and allocation of the parts of which they consist, but in the differences which the species present, each being in every respect so admirably fitted for the situation in which it is placed, and the offices it is intended to perform: this of itself explains, to a considerable extent, the variations which Nature's forms present, but on a more extended examination it is perceived that there exist in similar places, and performing similar functions, creatures which of course resemble each other in their adaptations to that station and those habits, but yet in their general organization differ most remarkably, some of them perhaps resembling others whose places and functions are of a totally different nature; and on searching further still, we see that Nature has, as it were (though in no way to the detriment of their perfection), limited herself in her contrivances, exhibiting that unity of plan before alluded to, by adopting certain original types or models, modifying their details in various ways to meet the ends required: it is upon this latter law that natural affinities must depend, since, were every species constructed upon a plan peculiar to itself, solely with regard to fitness for its place, we should look in vain for those general resemblances on which we found our more comprehensive groups. In a species, of course, every character tells: to identify another individual as being of the same species a perfect resemblance is necessary, allowing only for such differences as age, sex, food, locality and other known causes, may have occasioned; but in grouping species together, where we consider both differences and resemblances, it is obvious that our groups, to be those of Nature, must be founded on the type by which their organization is determined. And it will be seen, that in all classifications which have been to any extent adopted, the higher divisions have for the most part been formed upon this principle, but it is on descending into the details of the systems, that amidst the multiplicity of characters, especially as those purely adaptive are usually the most conspicuous, the natural affinities have failed to be perceived.

The word "type" is here used in a sense rather different from that in which it has very frequently been applied, and in which perhaps to

some naturalists it may be most familiar. Instead of being applied to a single species or group, made use of as a standard to which other species or groups are to be compared, it is here used to signify a certain plan or model, on which a large number of species are constructed, and whose characteristic peculiarities show themselves throughout the whole series, notwithstanding the great variety which the different adaptations may occasion: a similar constancy of character through a certain number of the species included in the more extended type, of course will constitute them a subordinate type. Then the course to be pursued in the construction of a natural system (that is, so far natural as possible, by forming every group according to the true affinities of the species which it contains) is, by an extended and rigid investigation, to search out the characters by which the natural affinities are indicated; and in descending from the higher divisions to the lower, to make no use of the adaptive characters, until we are certain that the *essential* characters (that being the term most generally adopted to imply those by which the type may be recognized) are completely exhausted; and then, having fully ascertained the natural subdivisions of the group to which our attention has been directed, to dispose them in such different degrees of rank, and in such an arrangement, as shall seem most convenient for purposes of description, and, from the judicious manner in which it is effected, be likely to meet with general approval and adoption among those engaged in similar researches.

Commencing, in this course of investigation, with the largest and most extensive divisions, it will, it is manifest, be necessary to disregard, until a late period, a great number of characters, which, from their conspicuous appearance, are such as might otherwise have been the first to attract our notice, and have been the stumbling-blocks to which most of the errors of the old systematists owe their origin; and to proceed to classify upon peculiarities of structure, which, from their constancy and independence of adaptive modifications, we have ascertained to belong to the type. It is almost impossible to lay down rules for the pursuit of such a search; the characters in question may be obvious, may be apparently trifling; in animals of more complex organization, it seems hardly necessary to add that they can seldom be external. They must, of course, be first looked for in those organs whose offices are of the highest importance, in the performance of the vital functions of the creature, and, as has before been observed, it is upon these that the more extensive groups have most generally been founded; but those beautiful laws of correlation, everywhere pervading

the structure of an animal body, are not only manifested in the constant accompaniment of one adaptive modification, by another whose co-existence is necessary for the perfection of the contrivance, but in the essential characters are even still more striking; peculiarities minute, and to appearance trifling, accompanying those of evidently great importance to the organization, with such unvaried constancy as to be fully as worthy of the confidence of the systematist as the more important characters themselves. It seems probable that, next to the differences presented by the vital parts, those of the osseous system in the vertebrate series (and by analogy, not unlikely, the external casing among the articulated division) would be easiest to perceive, and most to be depended on, from the permanence of their form, the facility of preservation, and from such being the only parts left for our observation of the species which have become extinct; but even these harder organs show the essential and adaptive characters so intimately mixed together, that a very extensive series of observations, aided by a knowledge of the relations they possess to the other parts of which the animal consists, and combined with very sound and careful judgment, is absolutely necessary before any results worthy of our confidence can be arrived at. These remarks may perhaps derive some little support from the circumstance, that in all cases where a generalization has been fully and clearly demonstrated to be a law of nature, it has been, after a long and detailed course of observations, carefully made, and summed up with the soundest of human skill and judgment.

The mention of some well-known instances may here again be useful, in illustration both of the meaning intended and of the manner in which the essential characters were occasionally perceived, and so often overlooked, by the older authors. The order Cetacea will serve this purpose well: all systematists have agreed in placing these animals among Mammalia, notwithstanding their wide difference of form from that of others of the class, perceiving that warm blood, pulmonary respiration, viviparous generation (in its true sense) and lactation, were essential characters of the class, being combined constantly in it, and not in any other, not even one of them obtaining in that which in external form the Cetacea most resemble; but even the illustrious Cuvier failed to perceive, that those species which he denominated "herbivorous Cetacea" belong truly (as is acknowledged by many of the more philosophic zoologists of the present day) to the order that he called Pachydermata; the simple absence of hind extremities, from its conspicuity, causing the close resemblance to the last-named

order in many points of structure (very perceptible in the skull) to be disregarded ; while the seals, which fortunately happened to possess the posterior limbs, and a dentition somewhat resembling that usually seen in the order to which they belong, were at an early period assigned to their true place among the Carnivora. As a well-known example illustrative of what characters are really essential, although their necessary connection with the plan of organization peculiar to the type may not be very obvious, may be mentioned the articulation of the head to the atlas by two condyles, one on each side of the occipital foramen ; the articulation of the lower jaw by a more or less convex condyle, moving in a glenoid cavity excavated in the zygomatic process of the temporal bone, instead of by a hollowed surface in the jaw articulating with a condyle furnished to it by the tympanic bone ; the ossification of each ramus of the lower jaw from one point, instead of its consisting, either originally or permanently, of several pieces : these, among other peculiarities of greater or less apparent consequence, are all so constantly associated in the Mammalian class with those before alluded to as being essential characters of that group, that there can be no doubt of their appertaining equally to the type, or model, upon which such animals are constructed ; and a friend who has devoted some time to the examination of the minute distribution of the sympathetic nerves about the face and within the orbit of different animals, and who it is to be hoped may publish his researches, recently informed the writer, that the Cetacea presented in that respect precisely the same arrangement as in other Mammalia, while in fishes it was widely different ; so that we need not always reject a character because it is minute, if the course of observation shows it to be constant in relation to the group in which we find it.

It being here desirable to select such instances as, from their being universally known and acknowledged, could not, most probably, with reason be disputed, it will be seen that those mentioned refer exclusively to the higher groups ; and as, even in these, errors are seen to have crept into the systems adopted, through the masking of the essential characters by the greater conspicuity of those relating solely to the particular wants of the species, we may suppose, *à fortiori*, since the differences between closely allied species consist merely of adaptive variations and slight modifications of form, that, as we descend from higher to lower groups, the essential distinctions becoming fewer and more difficult to perceive, there must be a far greater scope for the labours of the systematist, in correcting the erroneous principles on which the older classifications have been founded : and the researches carried on within the last few years, by some of our

more philosophic naturalists, show clearly, in those departments of the science to which their labours have been directed, the advantages of such a system of study as that here feebly attempted to be pointed out; and the former errors which they have succeeded in exposing, together with the precision of their results when compared with the confusion formerly existing, seem of themselves sufficient to convince that a great work of correction remains to be carried out, involving a long series of patient and profound investigations, which it must require the unwearied exertions of many to accomplish.

If, in what is known already, we perceive sufficient to convince us that affinities really have existence in Nature, we need no longer doubt the importance, indeed the necessity, of ascertaining them to the furthest extent possible; for the course of scientific investigation has in all cases shown, that every newly-discovered law of Nature, when the effects of its operation are carefully deduced, opens out a still wider field for research, leading to further and often higher generalizations: in the present case, relations are continually being perceived between certain groups of forms and certain geographical limits, it being often seen that such members of a large group as are confined within a certain locality show affinities among themselves uniting them into a smaller group; sometimes while one group has extensive distribution, another, seemingly of equal rank, is more confined; and in certain cases, a species, or group of species, in one part of the world, so represents another in a different region, by performing similar functions, that the affinity between them has, from the resemblance of their adaptive characters, been considered to be closer than it really is. Such things, at present only known as curious and interesting facts, may perhaps, when affinities are better understood and thoroughly worked out, lead to generalizations at present not imagined; these, united with researches continually in progress on forms existing at different epochs, may, it is not impossible, carry us still further in our investigation of those laws by which the varied inhabitants of our earth have been distributed upon its surface, their influence in its changes, and the consequent alterations which have been caused in their location; indeed it is impossible to predict, in searching after one small truth, what treasures we may pick up on the way, or what brilliant lights may open to us on its discovery. Then certainly it is not just, that the science which treats of Nature's forms should be looked upon as less worthy of pursuit, by men of highest mind, when its backward state is only owing to its vast extent; and even the classification and arrangement of the different forms in which organic life appears (which, as they themselves are compared to the

letters of an alphabet, may be not inaptly likened to the combination of those letters in composing words whose meanings differ in extent), in advancing towards correct achievement, continually require more votaries to share the increasing amount of study necessary, unite their labours in one common end, and, by heaping scattered knowledge into generalizations more easy to the comprehension, the well-directed labour of each individual renders a higher amount of knowledge attainable by every one,—just as in science itself, which is the entire investigation of Nature's truths, every newly-discovered law makes an intricate accumulation of recorded facts more clearly understood, at the same time opening out new and more extensive regions to be explored, inviting the co-operation of more investigators ; while each, in seeing how little his unassisted labour would suffice, feels deeper still his close dependence on the rest ; and were it the only benefit that science yields to man, to know our mutual interest in each other, the effect produced upon our conduct, by a general appreciation of this moral truth, would make us quite another, and a happier, race of beings.

H. N. TURNER, Jun.

1, Upper Belgrave Place, Pimlico,
September 29, 1847.

Ornithological and other Notices in Norfolk, for the months of July, August and September, 1847.—Early in the month of July, a specimen of the plain bonito (*Auxis vulgaris*) of Mr. Yarrell (Brit. Fishes, 2nd ed.) was captured off Yarmouth, and is now in the Museum of the Cambridge Philosophical Society. The measurements and description of this specimen almost exactly corresponded with those given by Mr. Yarrell, but we could not discover more than seven finlets behind the dorsal fin, whereas that gentleman makes eight : the number behind the anal fin is also seven. One of the peculiarities by which this fish as well as others of its tribe are distinguished, is the grooves and depressions into which the fins, when not erected, are received, and thus brought almost to the same level as the surrounding parts of the body. This fish has been previously taken off Yarmouth. We have been informed that a shoal of grampuses were seen near Lynn during this month, but have not been able to authenticate their appearance. On the 30th of August a curious variety of the chaffinch was killed at Brooke, by H. K. Tompson, Esq., by whom it has been presented to Mr. J. H. Gurney. The bird is a young male : the ground colour of its plumage is white, but pervaded throughout with a delicate canary yellow colour. This tint is strongest on the back and rump (especially the latter), on the edges of the quill feathers of the wings and of the tail feathers. The eyes are of the natural colour ; and the bird altogether bears a most striking resemblance to the variety of the very nearly allied species, the brambling, which was killed at Melton in 1844, and is described and figured in the Account of the Norfolk Birds (Zool. 1311). An example of the osprey (male) was killed near Cromer on the 3rd of September. We have seen four specimens of the red-necked phalarope which were killed at or near Salhouse, during the month of September : two of these, which were killed about the beginning

of the month, retained much of the summer plumage; in the other two, which occurred about the end of the month, it had almost entirely disappeared. We have also to record the capture, at different parts of the coast, in the same month, of four specimens of Richardson's skua, two of which were in immature, and the other two in adult plumage: of the latter, one was taken alive, and appears to do well in confinement, feeding readily on pieces of fresh-water fish. He has for his companion in confinement a night heron, with whom he appears to be on very good terms. A specimen of the black-tailed godwit also occurred in September at Salthouse. The angel fish has been taken at Yarmouth, and several specimens of the migratory locust have been captured in various parts of the county. It is observable that wild geese, during their migratory movements, fly in regular order,—usually in lines or wedge-shaped figures,—one acting as leader; and although the changes which our domestic race has undergone since it was reclaimed, render us unable to say with certainty from which of the wild species it originally sprang, or whether from any one exclusively, it still retains distinct traces of this singular habit; being constantly observed, in places where it is kept in flocks, to go and return to and from its feeding-grounds with great regularity, in long lines of single file.—*J. H. Gurney, W. R. Fisher; October, 1847.*

Habits of the Leech.—While staying at Folkestone, in August last, I found that horse-leeches were common in a ditch near the house. One day I noticed what appeared to be a leech and a worm adhering end to end: I took them out of the water, and, on pulling them asunder, found that the leech had swallowed a portion of the worm nearly equal to its own body in length; and on being drawn out the part seemed shrunk, as though it had been deprived of some portion of its juices. Another day I found that three leeches had attacked one worm, one of them having swallowed one end of it, another had swallowed a loop formed by the doubling of the worm, so that the other end was free, the third leech simply adhering by its mouth. I brought home two of the leeches in a bottle, and, having kept them about a month without food, on the 22nd of September, in the morning, I put into the bottle a moderate-sized earthworm: it had not been in ten minutes when one of them seized it by one extremity. In the middle of the day I noticed that the worm was doubled, a leech holding it by the loop: on this occasion I did not ascertain whether any part of the worm was within the body of the leech. In the evening I observed that the worm had been divided, and a portion of it, about a quarter of an inch in length, and of the usual thickness, projecting from the mouth of one of the leeches: I then removed this leech from the bottle, and taking the portion of worm with one hand, and the leech with the other, I drew out a considerable part of the worm, much shrunk, and very thin just at the part which the mouth of the leech had encircled. I subsequently put in two more worms and a small *Limax*, but the leeches took no notice of them: in the course of a few days they were drowned, and, beginning to decompose, I threw them out. Considering that in the leech the stomach (which has a number of little cœcal processes on each side) forms nearly the whole of the alimentary canal, the facts above mentioned are in no way inconsistent with its structure; therefore I should suppose the circumstance to be of frequent occurrence, although I am not aware of its having been before observed.—*H. N. Turner, Jun.; 1, Upper Belgrave Place, Pimlico, September 25, 1847.*

